

Europäisches Patentamt
European Patent Office
Office européen des brevets



(11) EP 1 310 571 B1

(12)

## **EUROPEAN PATENT SPECIFICATION**

(45) Date of publication and mention of the grant of the patent:
15.02.2006 Bulletin 2006/07

(51) Int Cl.: C12Q 1/70(2006.01) C12N 15/86(2006.01) C12Q 1/68(2006.01)

C07K 14/015 (2006.01) C12N 15/10 (2006.01) C12N 5/10 (2006.01)

(21) Application number: 02257826.4

(22) Date of filing: 12.11.2002

(54) A Method of identifying unknown adeno-associated virus (AVV) sequences and a kit for the method

Verfahren zur Identifizierung von Adeno-assoziiertem Virus (AAV) Sequenzen sowie Kit zur Ausführung der Methode

Une méthode d'identification de séquences de virus adéno-associés et kit permettant d'appliquer la méthode

(84) Designated Contracting States:

AT BE BG CH CY CZ DE DK EE ES FI FR GB GR
IE IT LI LU MC NL PT SE SK TR
Designated Extension States:

AL LT LV MK RO SI

(30) Priority: 13.11.2001 US 350607 P 17.12.2001 US 341117 P 01.05.2002 US 377066 P 05.06.2002 US 386675 P

- (43) Date of publication of application: 14.05.2003 Bulletin 2003/20
- (73) Proprietor: THE TRUSTEES OF THE UNIVERSITY OF PENNSYLVANIA
  Philadelphia,
  Pennsylvania 19104-6283 (US)
- (72) Inventors:
  - Gao, Guangping Rosemont, Pennsylvania 19010 (US)
  - Wilson, James M.
     Gladwyne, Pennsylvania 19035 (US)
  - Alvira, Maricio Philadelphia, Pennsylvania 19104 (US)
- (74) Representative: Hale, Stephen Geoffrey et al Bromhead Johnson, Kingsbourne House, 229-231 High Holborn London WC1V 7DP (GB)

(56) References cited: WO-A-02/18659

- GAO GUANG-PING ET AL: "Novel adeno-associated viruses from rhesus monkeys as vectors for human gene therapy."
   PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES, vol. 99, no. 18, 3 September 2002 (2002-09-03), pages 11854-11859, XP002229849 http://www.pnas.org September 3, 2002 ISSN: 0027-8424
- FORSLUND OLA ET AL: "A broad range of human papillomavirus types detected with a general PCR method suitable for analysis of cutaneous tumours and normal skin." JOURNAL OF GENERAL VIROLOGY, vol. 80, no. 9, 1999, pages 2437-2443, XP002229850 ISSN: 0022-1317
- XIAO WEIDONG ET AL: "Gene therapy vectors based on adeno-associated virus type 1." JOURNAL OF VIROLOGY, vol. 73, no. 5, May 1999 (1999-05), pages 3994-4003, XP002229851 ISSN: 0022-538X
- GENE THERAPY, vol. 10, 2003, pages 194-196.
- PROC. NATL. ACAD. SCI. USA, vol. 100, no. 10, 2003, pages 6081-6086,
- J. VIROL., vol. 78, no. 12, 2004, pages 6381-6388,

Note: Within nine months from the publication of the mention of the grant of the European patent, any person may give notice to the European Patent Office of opposition to the European patent granted. Notice of opposition shall be filed in a written reasoned statement. It shall not be deemed to have been filed until the opposition fee has been paid. (Art. 99(1) European Patent Convention).

#### Description

#### BACKGROUND OF THE INVENTION

[0001] Adeno-associated virus (AAV), a member of the Parvovirus family, is a small nonenveloped, icosahedral virus with single-stranded linear DNA genomes of 4.7 kilobases (kb) to 6 kb. AAV is assigned to the genus, Dependovirus, because the virus was discovered as a contaminant in purified adenovirus stocks. AAV's life cycle includes a latent phase at which AAV genomes, after infection, are site specifically integrated into host chromosomes and an infectious phase in which, following either adenovirus or herpes simplex virus infection, the integrated genomes are subsequently rescued, replicated, and packaged into infectious viruses. The properties of non-pathogenicity, broad host range of infectivity, including non-dividing cells, and potential site-specific chromosomal integration make AAV an attractive tool for gene transfer.

[0002] Recent studies suggest that AAV vectors may be the preferred vehicle for gene therapy. To date, there have been 6-different serotypes of AAVs isolated from human or non-human primates (NHP) and well characterized. Among them, human serotype 2 is the first AAV that was developed as a gene transfer vector; it has been widely used for efficient gene transfer experiments in different target tissues and animal models. Gene therapy vectors based on adeno-associated virus type 1 have also been disclosed (Xiao et al. J. Virology; May 1999; pages 3994-4008). Clinical trials of the experimental application of AAV2 based vectors to some human disease models are in progress, and include such diseases as cystic fibrosis and hemophilia B.

[0003] A general PCR method suitable for detecting human papillomavirus types in cutaneous tumours and normal skin is known (Forslund et al J. of General Virology: 1999 80: P2437-2443).

[0004] What are desirable are AAV-based constructs for gene delivery.

#### SUMMARY OF THE INVENTION

25

35

[0005] In one aspect, the invention provides a novel method of identifying unknown AAV sequences from cellular DNAs of various human and non-human primate (NHP) tissues using bioinformatics analysis, PCR based gene amplification and cloning technology, based on the nature of latency and integration of AAVs in the absence of helper virus co-infection, the method being defined in claim 1 hereinafter.

[9006] In another aspect the invention provides a kit for use in the method of the invention, the kit being as defined in claim 23 hereinafter.

#### DETAILED DESCRIPTION OF THE INVENTION

[0007] In the present invention, the inventors have found a method which takes advantage of the ability of adeno-associated virus (AAV) to penetrate the nucleus, and, in the absence of a helper virus co-infection, to integrate into cellular DNA and establish a latent infection. This method utilizes a polymerase chain reaction (PCR)-based strategy for detection, identification of sequences of AAVs from DNAs from tissues of human and non-human primate origin as well as from other sources.

[0008] Nucleic acid sequences can be identified according to the method of the invention. One such adeno-associated virus is of the serotype, termed herein serotype 7 (AAV7), Other novel adeno-associated virus serotypes identified by the method include AAV10, AAV11, and AAV12.

[0009] Among particularly desirable AAV fragments which can be identified are the cap proteins, including the vp1, vp2, vp3, the hypervariable regions, the rep proteins, including rep 78, rep 68, rep 52, and rep 40, and the sequences encoding these proteins. Each of these fragments may be readily utilized in a variety of vector systems and host cells. Such fragments may be used alone, in combination with other AAV sequences or fragments, or in combination with elements from other AAV or non-AAV viral sequences. In one particularly desirable embodiment, a vector contains the AAV cap and/or rep sequences.

[0010] As described herein, alignments are performed using any of a variety of publicly or commercially available Multiple Sequence Alignment Programs, such as "Clustal W", accessible through Web Servers on the internet. Alternatively, Vector NTI utilities are also used. There are also a number of algorithms known in the art which can be used to measure nucleotide sequence identity, including those contained in the programs described above. As another example, polynucleotide sequences can be compared using Fasta, a program in GCG Version 6.1. Fasta provides alignments and percent sequence identity of the regions of the best overlap between the query and search sequences. For instance, percent sequence identity between nucleic acid sequences can be determined using Fasta with its default parameters (a word size of 6 and the NOPAM factor for the scoring matrix) as provided in GCG Version 6.1. Similar programs are available for amino acid sequences, e.g., the "Clustal X" program. Generally, any of these programs are used at default settings, although one of skill in the art can atter these settings as needed. Alternatively, one of skill in the art can utilize

another algorithm or computer program which provides at least the level of identity or alignment as that provided by the referenced algorithms and programs.

[0011] The term "substantial homology" or "substantial similarity," when referring to a nucleic acid, or fragment thereof, indicates that, when optimally aligned with appropriate nucleotide insertions or deletions with another nucleic acid (or its complementary strand), there is nucleotide sequence identity in at least about 95 to 99% of the aligned sequences. Preferably, the homology is over full-length sequence, or an open reading frame thereof, or another suitable fragment which is at least 15 nucleotides in length. Examples of suitable fragments are described herein.

[0012] The term "substantial homology" or "substantial similarity," when referring to amino acids or fragments thereof, indicates that, when optimally aligned with appropriate amino acid insertions or deletions with another amino acid, there is amino acid sequence identity in at least about 95 to 99% of the aligned sequences. Preferably, the homology is over full-length sequence, or a protein thereof, e.g., a cap protein, a rep protein, or a fragment thereof which is at least 8 amino acids, or more desirably, at least 15 amino acids in length. Examples of suitable fragments are described herein. [0013] By the term "highly conserved" is meant at least 80% identity, preferably at least 90% identity, and more preferably, over 97% identity. Identity is readily determined by one of skill in the art by resort to algorithms and computer programs known by those of skill in the art.

[0014] The term "percent sequence identity" or "identical" in the context of nucleic acid sequences refers to the residues in the two sequences which are the same when aligned for maximum correspondence. The length of sequence identity comparison may be over the full-length of the genome, the full-length of a gene coding sequence, or a fragment of at least about 500 to 5000 nucleotides, is desired. However, identity among smaller fragments, e.g. of at least about nine nucleotides, usually at least about 20 to 24 nucleotides, at least about 28 to 32 nucleotides, at least about 36 or more nucleotides, may also be desired. Similarly, "percent sequence identity" may be readily determined for amino acid sequences, over the full-length of a protein, or a fragment thereof. Suitably, a fragment is at least about 8 amino acids in length, and may be up to about 700 amino acids. Examples of suitable fragments are described herein.

[0015] The AAV sequences and fragments thereof are useful in production of rAAV, and are also useful as antisense delivery vectors, gene therapy vectors, or vaccine vectors.

[0016] As described herein, the vectors containing the AAV capsid proteins are particularly well suited for use in applications in which the neutralizing antibodies diminish the effectiveness of other AAV serotype based vectors, as well as other viral vectors. The rAAV vectors are particularly advantageous in rAAV readministration and repeat gene therapy. [0017] As used throughout this specification and the claims, the terms "comprising" and "including" and their variants are inclusive of other components, elements, integers, steps and the like. Conversely, the term "consisting" and its variants is exclusive of other components, elements, integers, steps and the like.

## I. Methods of the Invention

10

15

25

30

# A. Detection of Sequences Via Molecular Cloning

[0018] In one aspect, the invention provides a method of identifying target (unknown) nucleic acid sequences in a sample. This method is particularly well suited for detection of viral sequences which are integrated into the chromosome of a cell, e.g., adeno-associated viruses (AAV) and retroviruses, among others.

[0019] As used herein, a sample is any source containing nucleic acids, e.g., tissue, tissue culture, cells, cell culture, and biological fluids including, without limitation, urine and blood. These nucleic acid sequences may be DNA or RNA from plasmids, natural DNA or RNA from any source, including bacteria, yeast, viruses, and higher organisms such as plants or animals. DNA or RNA is extracted from the sample by a variety of techniques known to those of skill in the art, such as those described by Sambrook, Molecular Cloning: A Laboratory Manual (New York: Cold Spring Harbor Laboratory). The origin of the sample and the method by which the nucleic acids are obtained for application of the method of the invention is not a limitation of the present invention. Optionally, the method of the invention can be performed directly on the source of DNA, or on nucleic acids obtained (e.g., extracted) from a source.

[0020] The method of the invention involves subjecting a sample containing DNA to amplification via polymerase chain reaction (PCR) using a first set of primers specific for a first region of double-stranded nucleic acid sequences, thereby obtaining amplified sequences.

[0021] As used herein, each of the "regions" is predetermined based upon the alignment of the nucleic acid sequences of at least two serotypes (e.g., AAV) or strains (e.g., lentiviruses), and wherein each of said regions is composed of sequences having a 5' end which is highly conserved, a middle which is variable, and a 3' end which is highly conserved, each of these being conserved or variable relative to the sequences of at least AAV1-AAV6. The 5' and 3' ends are highly conserved over at least 18 base pairs (bp). However, one or both of the sequences at the 5' or 3' end may be conserved over more than 18 bp, more than 25 bp, more than 30 bp, or more than 50 bp at the 5' end. With respect to the variable region, there is no requirement for conserved sequences, these sequences may be relatively conserved, or may have less than 90, 80, or 70% identity among the aligned serotypes or strains.

[0022] Each of the regions may span about 100 bp to about 10 kilobase pairs in length, provided that the first region is at least 250 bp in length. However, it is particularly desirable that one of the regions is a "signature region", i.e., a region which is sufficiently unique to positively identify the amplified sequence as being from the target source. For example, in one embodiment, the first region is about 250 bp in length, and is sufficiently unique among known AAV sequences, that it positively identifies the amplified region as being of AAV origin. Further, the variable sequences within this region are sufficiently unique that can be used to identify the serotype from which the amplified sequences originate. Once amplified (and thereby detected), the sequences can be identified by performing conventional restriction digestion and comparison to restriction digestion patterns for this region in any of AAV1, AAV2, AAV3, AAV4, AAV5, or AAV6, or that of AAV7, AAV10, AAV11, AAV12, or any of the other novel serotypes identified by the invention, which is predetermined and provided by the present invention.

[0023] Given the guidance provided herein, one of skill in the art can readily identify such regions among other integrated viruses to permit ready detection and identification of these sequences. Thereafter, an optimal set of generic primers located within the highly conserved ends can be designed and tested for efficient amplification of the selected region from samples. This aspect of the invention is readily adapted to a diagnostic kit for detecting the presence of the target sequence (e.g., AAV) and for identifying the AAV serotype, using standards which include the restriction patterns for the AAV serotypes described herein or isolated using the techniques described herein. For example, quick identification or molecular serotyping of PCR products can be accomplished by digesting the PCR products and comparing restriction patterns.

[0024] Thus, in one embodiment, the "signature region" for AAV spans about bp 2800 to about 3200 of AAV 1 [SEQ ID NO:6], and corresponding base pairs in AAV 2, AAV3, AAV4, AAV5, and AAV6. More desirably, the region is about 250 bp, located within bp 2886 to about 3143 bp of AAV 1 [SEQ ID NO:6], and corresponding base pairs in AAV 2 [SEQ ID NO:7], AAV3 [SEQ ID NO8], and other AAV serotypes. To permit rapid detection of AAV in the sample, primers which specifically amplify this signature region are utilized. However, the present invention is not limited to the exact sequences identified herein for the AAV signature region, as one of skill in the art may readily alter this region to encompass a shorter fragment, or a larger fragment of this signature region.

[0025] The PCR primers are generated using techniques known to those of skill in the art. Each of the PCR primer sets is composed of a 5' primer and a 3' primer. See, e.g., Sambrook et al, cited herein. The term "primer" refers to an oligonucleotide which acts as a point of initiation of synthesis when placed under conditions in which synthesis of a primer extension product which is complementary to a nucleic acid strand is induced. The primer is preferably single stranded. However, if a double stranded primer is utilized, it is treated to separate its strands before being used to prepare extension products. The primers may be about 15 to 25 or more nucleotides, and preferably at least 18 nucleotides. However, for certain applications shorter nucleotides, e.g., 7 to 15 nucleotides are utilized.

[0026] The primers are selected to be sufficiently complementary to the different strands of each specific sequence to be amplified to hybridize with their respective strands. Therefore, the primer sequence need not reflect the exact sequence of the region being amplified. For example, a non-complementary nucleotide fragment may be attached to the 5' end of the primer, with the remainder of the primer sequence being completely complementary to the strand. Alternatively, non-complementary bases or longer sequences can be interspersed into the primer, provided that the primer sequence has sufficient complementarity with the sequence of the strand to be amplified to hybridize therewith and form a template for synthesis of the extension product of the other primer.

[0027] The PCR primers for the signature region are based upon the highly conserved sequences of two or more aligned sequences (e.g., two or more AAV serotypes). The primers can accommodate less than exact identity among the two or more aligned AAV serotypes at the 5' end or in the middle. However, the sequences at the 3' end of the primers correspond to a region of two or more aligned AAV serotypes in which there is exact identity over at least five, preferably, over at least nine base pairs, and more preferably, over at least 18 base pairs at the 3' end of the primers. Thus, the 3' end of the primers is composed of sequences with 100% identity to the aligned sequences over at least five nucleotides. However, one can optionally utilize one, two, or more degenerate nucleotides at the 3' end of the primer. [0028] For example, the primer set for the signature region of AAV was designed based upon a unique region within the AAV capsid, as follows. The 5' primer was based upon nt 2867-2891 of AAV2 [SEQ ID NO:7], 5'-GGTAATTCCTCCGGAAATTGGCATT3'. The 3' primer was designed based upon nt 3096-3122 of AAV2 [SEQ ID NO:7], 5'-GACTCATCAACAACAACTGGGGATTC-'3. However, one of skill in the art may have readily designed the primer set based upon the corresponding regions of AAV 1, AAV3, AAV4, AAV5, AAV6, or based upon the information provided herein, AAV7. AAV10, AAV11, AAV12, or another novel AAV. In addition, still other primer sets can be readily designed to amplify this signature region, using techniques known to those of skill in the art.

## B. Isolation of Target Sequences

35

40

45

[0029] As described herein, the present invention uses a first primer set which specifically amplifies the signature region of the target sequence, e.g., an AAV serotype, in order to permit detection of the target. In a situation in which

further sequences are desired, e.g., if a novel AA V serotype is identified, the signature region may be extended. Thus, the invention may further utilize one or more additional primer sets.

[0030] Suitably, these primer sets are designed to include either the 5' or 3' primer of the first primer set and a second primer unique to the primer set, such that the primer set amplifies a region 5' or 3' to the signature region which anneals to either the 5' end or the 3' end of the signature region. For example, a first primer set is composed of a 5' primer, P1 and a 3' primer P2 to amplify the signature region. In order to extend the signature region on its 3' end, a second primer set is composed of primer P1 and a 3' primer P4, which amplifies the signature region and contiguous sequences downstream of the signature region. In order to extend the signature region on its 5' end, a third primer set is composed of a 5' primer, P5, and primer P2, such that the signature region and contiguous sequences upstream of the signature region are amplified. These extension steps are repeated (or performed at the same time), as needed or desired. Thereafter, the products results from these amplification steps are fused using conventional steps to produce an isolated sequence of the desired length.

10

15

20

25

30

35

40

45

50

55

[0031] The second and third primer sets are designed, as with the primer set for the signature region, to amplify a region having highly conserved sequences among the aligned sequences. Reference herein to the term "second" or "third" primer set is for each of discussion only, and without regard to the order in which these primers are added to the reaction mixture, or used for amplification. The region amplified by the second primer set is selected so that upon amplification it anneals at its 5' end to the 3' end of the signature region. Similarly, the region amplified by the third primer set is selected so that upon amplification it anneals at its 3' end anneals to the 5' end of the signature region. Additional primer sets can be designed such that the regions which they amplify anneal to the either the 5' end or the 3' end of the extension products formed by the second or third primer sets, or by subsequent primer sets.

[0032] For example, where AAV is the target sequence, a first set of primers (P1 and P2) are used to amplify the signature region from the sample. In one desirable embodiment, this signature region is located within the AAV capsid. A second set of primers (P1 and P4) is used to extend the 3' end of the signature region to a location in the AAV sequence which is just before the AAV 3' ITR, i.e., providing an extension product containing the entire 3' end of the AAV capsid when using the signature region as an anchor. In one embodiment, the P4 primer corresponds to nt 4435 to 4462 of AAV2 [SEQ ID NO:7], and corresponding sequences in the other AAV serotypes. This results in amplification of a region of about 1.6 kb, which contains the 0.25 kb signature region. A third set of primers (P3 and P2) is used to extend the 5' end of signature region to a location in the AAV sequences which is in the 3' end of the rep genes, i.e., providing an extension product containing the entire 5' end of the AAV capsid when using the signature region as an anchor. In one embodiment, the P3 primer corresponds to nt 1384 to 1409 of AAV2 [SEQ ID NO:7], and corresponding sequences in the other AAV serotypes. This results in amplification of a region of about 1.7 kb, which contains the 0.25 kb signature region. Optionally, a fourth set of primers are used to further extend the extension product containing the entire 5' end of the AAV capsid to also include the rep sequences. In one embodiment, the primer designated P5 corresponds to nt 108 to 133 of AAV2 [SEQ ID NO:7], and corresponding sequences in the other AAV serotypes and is used in conjunction with the P2 primer.

[0033] Following completion of the desired number of extension steps, the various extension products are fused, making use of the signature region as an anchor or marker, to construct an intact sequence. In the example provided herein, AAV sequences containing, at a minimum, an intact AAV cap gene are obtained. Larger sequences may be obtained, depending upon the number of extension steps performed.

[0034] Suitably, the extension products are assembled into an intact AAV sequence using methods known to those of skill in the art. For example, the extension products may be digested with Dralll, which cleaves at the Dralll site located within the signature region, to provide restriction fragments which are re-ligated to provide products containing (at a minimum) an intact AAV cap gene. However, other suitable techniques for assembling the extension products into an intact sequence may be utilized. See, generally, Sambrook et al, cited herein.

[0035] As an alternative to the multiple extension steps described above, another embodiment of the invention provides for direct amplification of a 3.1 kb fragment which allows isolation of full-length cap sequences. To directly amplify a 3.1 kb full-length cap fragment from NHP tissue and blood DNAs, two other highly conserved regions were identified in AAV genomes for use in PCR amplification of large fragments. A primer within a conserved region located in the middle of the rep gene is utilized (AV1ns: 5' GCTGCGTCAACTGGACCAATGAGAAC 3', nt of SEQ ID NO:6) in combination with the 3' primer located in another conserved region downstream of the Cap gene (AV2cas: 5' CGCAGAGACCAAAGTTCAACTGAAACGA 3', SEQ ID NO:7) for amplification of AAV sequences including the full-length AAV cap. Typically, following amplification, the products are cloned and sequence analysis is performed with an accuracy of ≥ 99.9%. Using this method, the inventors have isolated at least 50 capsid clones which have subsequently been characterized. Among them, 37 clones were derived from Rhesus macaque tissues (rh.1 - rh.37), 6 clones from cynomologous macaques (cy.1 - cy.6), 2 clones from Baboons (bb.1 and bb.2) and 5 clones from Chimps (ch.1 - ch.5). These clones are identified elsewhere in the specification, together with the species of animal from which they were identified and the tissues in that animal these novel sequences have been located.

#### II. Diagnostic Kit

20

25

40

[0036] In another aspect, the invention provides a diagnostic kit as defined in claim 23 hereinafter for detecting the presence of an unknown adeno-associated virus (AAV) in a sample. Such a kit may contain a first set of 5' and 3' PCR primers specific for a signature region of the AAV nucleic acid sequence. Alternatively, or additionally, such a kit can contain a first set of 5' and 3' PCR primers specific for the 3.1 kb fragment which includes the full-length AAV capsid nucleic acid sequence identified herein (e.g., the AV1ns and AV2cas primers.) Optionally, a kit of the invention may further contain two or more additional sets of 5' and 3' primers, as described herein, and/or PCR probes. These primers and probes are used according to the present invention to amplify signature regions of each AAV serotype, e.g., using quantitative PCR.

[0037] Such a kit may further include one or more restriction enzymes, standards for AAV serotypes providing their "signature restriction enzyme digestions analyses", and/or other means for determining the serotype of the AAV detected. [0038] In addition, kits of the invention may include, instructions, a negative and/or positive control, containers, diluents and buffers for the sample, indicator charts for signature comparisons, disposable gloves, decontamination instructions, applicator sticks or containers, and sample preparator cups, as well as any desired reagents, including media, wash reagents and concentration reagents. Such reagents may be readily selected from among the reagents described herein, and from among conventional concentration reagents. In one desirable embodiment, the wash reagent is an isotonic saline solution which has been buffered to physiologic pH, such as phosphate buffered saline (PBS); the elution reagent is PBS containing 0.4 M NaCl, and the concentration reagents and devices. For example, one of skill in the art will recognize that reagents such as polyethylene glycol (PEG), or NH<sub>4</sub>SO<sub>4</sub> may be useful, or that devices such as filter devices. For example, a filter device with a 100 K membrane would concentrate rAAV.

[0039] The kits provided by the present invention are useful for performing the methods described herein, and for study of biodistribution, epidemiology, mode of transmission of novel AAV serotypes in human and NHPs.

[0040] Thus, the methods and kits of the invention permit identification of target AAV sequences, particularly integrated AAV sequences.

[0041] In one notable example, the method of the invention facilitated analysis of cloned AAV sequences by the inventors, which revealed heterogeneity of proviral sequences between cloned fragments from different animals, all of which were distinct from the known six AAV serotypes, with the majority of the variation localized to hypervariable regions of the capsid protein. Surprising divergence of AAV sequences was noted in clones isolated from single tissue sources, such as lymph node, from an individual rhesus monkey. This heterogeneity is best explained by apparent evolution of AAV sequence within ind ividual animals due, in part, to extensive homologous recombination between a limited number of co-infecting parenteral viruses. These studies suggest sequence evolution of widely disseminated virus during the course of a natural AAV infection that presumably leads to the formation of swarms of quasispecies which differ from one another in the array of capsid hypervariable regions. This is the first example of rapid molecular evolution of a DNA virus in a way that formerly was thought to be restricted to RNA viruses.

[0042] Sequences of several novel AAV serotypes identified by the method of the invention and characterization of these serotypes is provided.

III. Novel AAV Serotypes

A. Nucleic Acid Sequences

[0043] Nucleic acid sequences of novel AAV serotypes identified by the methods of the invention are provided. See, SEQ ID NO:1, 9 - 59, and 117 - 120. See also and the sequence listing.

[0044] For novel serotype AAV7, the full-length sequences, including the AAV 5' ITRs, capsid, rep, and AAV 3' ITRs are provided in SEQ ID NO:1.

[0045] For other novel AA V serotypes, the approximately 3.1 kb fragment isolated according to the method of the invention is provided. This fragment contains sequences encoding full-length capsid protein and all or part of the sequences encoding the rep protein. These sequences include the clones identified below.

[0046] For still other novel AAV serotypes, the signature region encoding the capsid protein is provided. For example, the AAV10 nucleic acid sequences include those illustrated in See, SEQ ID NO:117, which spans 255 bases. The AAV11 nucleic acid sequences include the DNA sequences illustrated in SEQ ID NO:118 which spans 258 bases. The AAV12 nucleic acid sequences include the DNA sequences illustrated in SEQ ID NO: 119, which consists of 255 bases. Using the methodology described above, further AAV10, AAV11 and AAV 12 sequences can be readily identified and used for a variety of purposes, including those described for AAV7 and the other novel serotypes herein.

[0047] Novel NHP sequences identified by the invention include those provided in the following Table I, which are identified by clone number:

# Table I

| AAV Cap<br>Sequence | Clone<br>Number | Source  |        |                    |
|---------------------|-----------------|---------|--------|--------------------|
|                     | ·               | Species | Tissue | SEQ ID NO<br>(DNA) |
| [Rh.I]              | Clone 9 (AAV9)  | Rhesus  | Heart  | 5                  |
| Rh.2                | Clone 43.1      | Rhesus  | MLN    | 39                 |
| Rh.3                | Clone 43.5      | Rhesus  | MLN    | 40                 |
| Rh.4                | Clone 43. [2]   | Rhesus  | MLN    | 41                 |
| Rh.5                | Clone 43.20     | Rhesus  | MLN    | 42                 |
| Rh.6                | Clone 43.21     | Rhesus  | MLN    | 43                 |
| Rh.7                | Clone 43.23     | Rhesus  | MLN    | 44                 |

# Table 1 (cont'd)

| 5 |  |
|---|--|
| - |  |

| Rh.8         Clone 44.1         Rhesus         Liver         46           Rh.9         Clone 44.1         Rhesus         Liver         46           Rh.10         Clone 44.2         Rhesus         Liver         59           Rh.11         Clone 44.5         Rhesus         Liver         47           Rh.12         Clone         Rhesus         MLN         30           Rh.13         42.2         Rhesus         MLN         9           Rh.14         Clone         Rhesus         MLN         32           42.3A         Rh.15         Clone         Rhesus         MLN         36           42.3A         Rh.16         Clone 42.4         Rhesus         MLN         33           Rh.17         Clone         Rhesus         MLN         33           Rh.17         Clone         Rhesus         MLN         34           Rh.18         Clone         Rhesus         MLN         38           Rh.19         Clone Rhesus         MLN         38           Rh.20         Clone 42.8         Rhesus         MLN         35           Rh.21         Clone 42.10         Rhesus         MLN         37           Rh.2                                                                                            |             |                                       |        |             |              |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|---------------------------------------|--------|-------------|--------------|
| Rh.10         Clone 44.2         Rhesus         Liver         59           Rh.11         Clone 44.5         Rhesus         Liver         47           Rh.12         Clone         Rhesus         MLN         30           Rh.13         42.2         Rhesus         MLN         9           Rh.14         Clone         Rhesus         MLN         32           Rh.15         Clone         Rhesus         MLN         33           Rh.16         Clone 42.4         Rhesus         MLN         33           Rh.17         Clone         Rhesus         MLN         34           Rh.17         Clone         Rhesus         MLN         34           Rh.19         Clone         Rhesus         MLN         38           Rh.19         Clone         Rhesus         MLN         38           Rh.20         Clone 42.8         Rhesus         MLN         35           Rh.21         Clone 42.10         Rhesus         MLN         37           Rh.21         Clone 42.11         Rhesus         MLN         37           Rh.22         Clone 42.12         Rhesus         MLN         31           Rh.24         Clone 42.1                                                                                            | Rh.8        | Clone 43.25                           | Rhesus | MLN         | 45           |
| Rh.11         Clone 44.5         Rhesus MLN         47           Rh.12         Clone Ad.1B         Rhesus MLN         30           Rh.13         42.2         Rhesus MLN         9           Rh.14         Clone Ad.3A         Rhesus MLN         32           Rh.15         Clone Rhesus MLN         36           Rh.16         Clone 42.4         Rhesus MLN         33           Rh.17         Clone Rhesus MLN         34           Rh.18         Clone Rhesus MLN         29           42.5B         MLN         38           Rh.19         Clone Rhesus MLN         38           42.6B         Rhesus MLN         27           Rh.20         Clone 42.8         Rhesus MLN         35           Rh.21         Clone 42.10         Rhesus MLN         37           Rh.22         Clone 42.11         Rhesus MLN         37           Rh.23         Clone 42.12         Rhesus MLN         38           Rh.24         Clone 42.13         Rhesus MLN         31           Rh.25         Clone 42.13         Rhesus MLN         31           Rh.26         Clone 22.3.2         Rhesus Liver         50           Rh.27         Clone 223.5                                                                          | Rh.9        | Clone 44.1                            | Rhesus | Liver       | 46           |
| Rh.12         Clone 42.1B         Rhesus MLN         9           Rh.13         42.2         Rhesus MLN         9           Rh.14         Clone Mesus MLN         32           Rh.15         Clone Rhesus MLN         36           Rh.16         Clone 42.4         Rhesus MLN         33           Rh.17         Clone Rhesus MLN         34           Rh.18         Clone Rhesus MLN         29           42.5B         Rh.19         Clone Rhesus MLN         38           Rh.20         Clone 42.8         Rhesus MLN         35           Rh.21         Clone 42.10         Rhesus MLN         37           Rh.22         Clone 42.11         Rhesus MLN         37           Rh.23         Clone 42.12         Rhesus MLN         31           Rh.24         Clone 42.13         Rhesus MLN         31           Rh.25         Clone 42.13         Rhesus MLN         31           Rh.26         Clone 223.2         Rhesus MLN         32           Rh.27         Clone 223.4         Rhesus Liver         49           Rh.27         Clone 223.4         Rhesus Liver         50           Rh.28         Clone 223.5         Rhesus Liver         51                                                             | Rh.10       | Clone 44.2                            | Rhesus | Liver       | 59           |
| Rh.13                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Rh.11       | Clone 44.5                            | Rhesus | Liver       | 47           |
| Rh.13         42.2         Rhesus         MLN         9           Rh.14         Clone         Rhesus         MLN         32           Rh.15         Clone         Rhesus         MLN         36           Rh.16         Clone 42.4         Rhesus         MLN         33           Rh.17         Clone         Rhesus         MLN         34           Rh.17         Clone         Rhesus         MLN         34           Rh.19         Clone         Rhesus         MLN         29           Rh.19         Clone         Rhesus         MLN         34           Rh.20         Clone 42.8         Rhesus         MLN         37           Rh.21         Clone 42.10         Rhesus         MLN         35           Rh.21         Clone 42.11         Rhesus         MLN         37           Rh.22         Clone 42.11         Rhesus         MLN         38           Rh.23         Clone 42.13         Rhesus         MLN         38           Rh.24         Clone 42.13         Rhesus         Liver         49           Rh.25         Clone 42.15         Rhesus         Liver         50           Rh.26         Cl                                                                                            | Rh.12       | Clone                                 | Rhesus | MLN         | 30           |
| Rh.14         Clone 42.3A         Rhesus 42.3A         MLN         32           Rh.15         Clone 42.3B         Rhesus MLN         36           Rh.16         Clone 42.4 Rhesus MLN         33           Rh.17         Clone Rhesus MLN         34           Rh.18         Clone Rhesus MLN         29           Rh.19         Clone Rhesus MLN         38           Rh.20         Clone 42.8 Rhesus MLN         35           Rh.21         Clone 42.10 Rhesus MLN         35           Rh.22         Clone 42.11 Rhesus MLN         37           Rh.23         Clone 42.12 Rhesus MLN         31           Rh.24         Clone 42.13 Rhesus MLN         31           Rh.25         Clone 42.15 Rhesus MLN         31           Rh.26         Clone 223.2 Rhesus Liver         49           Rh.27         Clone 223.4 Rhesus Liver         50           Rh.28         Clone 223.5 Rhesus Liver         51           Rh.29         Clone 223.6 Rhesus Liver         52           Rh.30         Clone 223.7 Rhesus Liver         52           Rh.31         Clone Rhesus Liver         52           Rh.32         Clone C1         Rhesus Liver         52           Rh.34         Clo                                  |             | 42.1B                                 |        |             |              |
| Rh.15                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Rh.13       | 42.2                                  | Rhesus | MLN         | 9            |
| Rh.15         Clone 42.3B         Rhesus MLN         36           Rh.16         Clone 42.4         Rhesus MLN         33           Rh.17         Clone Rhesus MLN         34           Rh.18         Clone Rhesus MLN         29           Rh.19         Clone Rhesus MLN         38           Rh.20         Clone 42.8 Rhesus MLN         35           Rh.21         Clone 42.10 Rhesus MLN         35           Rh.22         Clone 42.11 Rhesus MLN         37           Rh.23         Clone 42.12 Rhesus MLN         31           Rh.24         Clone 42.13 Rhesus MLN         31           Rh.25         Clone 42.15 Rhesus MLN         31           Rh.26         Clone 223.2 Rhesus Liver         49           Rh.27         Clone 223.4 Rhesus Liver         50           Rh.28         Clone 223.5 Rhesus Liver         51           Rh.29         Clone 223.7 Rhesus Liver         52           Rh.30         Clone 223.7 Rhesus Liver         53           Rh.31         Clone Rhesus Liver         53           Rh.32         Clone C1 Rhesus Liver         48           223.10         Rhesus Liver         20           Rh.33         Clone C3 Rhesus Liver         21     <                              | Rh.14       | Clone                                 | Rhesus | MLN         | 32           |
| Rh.16                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |             | 42.3A                                 |        |             |              |
| Rh.16         Clone 42.4         Rhesus MLN         33           Rh.17         Clone 42.5A         Rhesus MLN         34           Rh.18         Clone 42.5B         MLN         29           Rh.19         Clone Rhesus MLN         38           Rh.20         Clone 42.8         Rhesus MLN         27           Rh.21         Clone 42.10         Rhesus MLN         35           Rh.21         Clone 42.11         Rhesus MLN         37           Rh.22         Clone 42.12         Rhesus MLN         37           Rh.23         Clone 42.13         Rhesus MLN         38           Rh.24         Clone 42.13         Rhesus MLN         31           Rh.25         Clone 42.15         Rhesus MLN         31           Rh.26         Clone 223.2         Rhesus Liver         49           Rh.27         Clone 223.2         Rhesus Liver         50           Rh.28         Clone 223.5         Rhesus Liver         51           Rh.29         Clone 223.6         Rhesus Liver         52           Rh.30         Clone 223.7         Rhesus Liver         53           Rh.31         Clone Clon | Rh.15       | Clone                                 | Rhesus | MLN         | 36           |
| Rh.17         Clone 42.5A         Rhesus 42.5A         MLN         34           Rh.18         Clone 42.5B         Rhesus MLN         29           Rh.19         Clone 42.8         Rhesus MLN         38           Rh.20         Clone 42.8         Rhesus MLN         27           Rh.21         Clone 42.10         Rhesus MLN         35           Rh.22         Clone 42.11         Rhesus MLN         37           Rh.23         Clone 42.12         Rhesus MLN         38           Rh.24         Clone 42.13         Rhesus MLN         38           Rh.24         Clone 42.13         Rhesus MLN         31           Rh.25         Clone 42.15         Rhesus MLN         28           Rh.26         Clone 223.2         Rhesus MLN         28           Rh.27         Clone 223.4         Rhesus Liver         50           Rh.28         Clone 223.5         Rhesus Liver         51           Rh.29         Clone 223.6         Rhesus Liver         52           Rh.30         Clone 23.7         Rhesus Liver         53           Rh.31         Clone C1         Rhesus Liver         48           Rh.32         Clone C3         Rhesus Liver         20     <                                          | L           | 42.3B                                 |        | _           |              |
| Rh.18                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Rh.16       | Clone 42.4                            | Rhesus | MLN         | 33           |
| Rh.18         Clone 42.5B         Rhesus MLN         29           Rh.19         Clone 42.8         Rhesus MLN         38           Rh.20         Clone 42.8         Rhesus MLN         27           Rh.21         Clone 42.10         Rhesus MLN         35           Rh.22         Clone 42.11         Rhesus MLN         37           Rh.23         Clone 42.12         Rhesus MLN         31           Rh.24         Clone 42.13         Rhesus MLN         31           Rh.25         Clone 42.15         Rhesus MLN         28           Rh.26         Clone 223.2         Rhesus Liver         49           Rh.27         Clone 223.4         Rhesus Liver         50           Rh.28         Clone 223.5         Rhesus Liver         51           Rh.29         Clone 223.6         Rhesus Liver         52           Rh.30         Clone 223.7         Rhesus Liver         53           Rh.31         Clone Rhesus Liver         48           223.10         Rhesus Liver         20           Rh.34         Clone C3         Rhesus Liver         21           Rh.36         Clone F1         Rhesus Liver         22           Rh.36         Clone F3                                                       | Rh.17       | Clone                                 | Rhesus | MLN         | 34           |
| Rh.19                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |             | 42.5A                                 |        |             |              |
| Rh.19         Clone 42.6B         Rhesus MLN         38           Rh.20         Clone 42.8         Rhesus MLN         27           Rh.21         Clone 42.10         Rhesus MLN         35           Rh.22         Clone 42.11         Rhesus MLN         37           Rh.23         Clone 42.12         Rhesus MLN         58           Rh.24         Clone 42.13         Rhesus MLN         31           Rh.25         Clone 42.15         Rhesus MLN         28           Rh.26         Clone 223.2         Rhesus Liver         49           Rh.27         Clone 223.4         Rhesus Liver         50           Rh.28         Clone 223.5         Rhesus Liver         51           Rh.29         Clone 223.6         Rhesus Liver         52           Rh.30         Clone 223.7         Rhesus Liver         53           Rh.31         Clone Rhesus Liver         48           223.10         Rhesus Liver         48           Rh.32         Clone C1         Rhesus Spleen, Duo, Kid & Liver           Rh.33         Clone C5         Rhesus Liver         20           Rh.34         Clone C5         Rhesus Liver         22           Rh.36         Clone F1                                               | Rh.18       | Clone                                 | Rhesus | MLN         | 29           |
| Rh.20                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |             | 42.5B                                 |        |             |              |
| Rh.20         Clone 42.8         Rhesus         MLN         27           Rh.21         Clone 42.10         Rhesus         MLN         35           Rh.22         Clone 42.11         Rhesus         MLN         37           Rh.23         Clone 42.12         Rhesus         MLN         37           Rh.24         Clone 42.13         Rhesus         MLN         31           Rh.25         Clone 42.15         Rhesus         MLN         28           Rh.25         Clone 42.15         Rhesus         Liver         49           Rh.26         Clone 223.2         Rhesus         Liver         50           Rh.27         Clone 223.4         Rhesus         Liver         50           Rh.28         Clone 223.5         Rhesus         Liver         51           Rh.29         Clone 223.6         Rhesus         Liver         52           Rh.30         Clone 223.7         Rhesus         Liver         53           Rh.31         Clone         Rhesus         Liver         48           Rh.32         Clone C1         Rhesus         Spleen, Duo,         19           Rh.33         Clone C3         Rhesus         20                                                                               | Rh.19       | Clone                                 | Rhesus | MLN         | 38           |
| Rh.21         Clone 42.10         Rhesus         MLN         35           Rh.22         Clone 42.11         Rhesus         MLN         37           Rh.23         Clone 42.12         Rhesus         MLN         58           Rh.24         Clone 42.13         Rhesus         MLN         31           Rh.25         Clone 42.15         Rhesus         MLN         28           Rh.26         Clone 223.2         Rhesus         Liver         49           Rh.26         Clone 223.2         Rhesus         Liver         50           Rh.27         Clone 223.4         Rhesus         Liver         50           Rh.28         Clone 223.5         Rhesus         Liver         51           Rh.29         Clone 223.6         Rhesus         Liver         52           Rh.30         Clone 223.7         Rhesus         Liver         53           Rh.31         Clone Rhesus         Liver         48           223.10         Rhesus         Spleen, Duo,<br>Kid & Liver         19           Rh.32         Clone C3         Rhesus         20           Rh.33         Clone C5         Rhesus         21           Rh.36         Clone F1                                                                     |             |                                       |        |             |              |
| Rh.22         Clone 42.11         Rhesus         MLN         37           Rh.23         Clone 42.12         Rhesus         MLN         58           Rh.24         Clone 42.13         Rhesus         MLN         31           Rh.25         Clone 42.15         Rhesus         MLN         28           Rh.26         Clone 223.2         Rhesus         Liver         49           Rh.27         Clone 223.4         Rhesus         Liver         50           Rh.28         Clone 223.5         Rhesus         Liver         51           Rh.29         Clone 223.6         Rhesus         Liver         52           Rh.30         Clone 223.7         Rhesus         Liver         53           Rh.31         Clone 223.7         Rhesus         Liver         48           Rh.31         Clone 23.7         Rhesus         Liver         48           Rh.32         Clone C1         Rhesus         Spleen, Duo, Kid & Liver         19           Rh.33         Clone C3         Rhesus         20           Rh.34         Clone C5         Rhesus         21           Rh.35         Clone F1         Rhesus         23           Rh.36         C                                                                 |             |                                       | Rhesus |             |              |
| Rh.23         Clone 42.12         Rhesus         MLN         58           Rh.24         Clone 42.13         Rhesus         MLN         31           Rh.25         Clone 42.15         Rhesus         MLN         28           Rh.26         Clone 223.2         Rhesus         Liver         49           Rh.27         Clone 223.4         Rhesus         Liver         50           Rh.28         Clone 223.5         Rhesus         Liver         51           Rh.29         Clone 223.6         Rhesus         Liver         52           Rh.30         Clone 223.7         Rhesus         Liver         53           Rh.31         Clone 23.7         Rhesus         Liver         48           Rh.31         Clone 23.7         Rhesus         Liver         48           Rh.32         Clone C1         Rhesus         Spleen, Duo, Kid & Liver         19           Rh.33         Clone C3         Rhesus         20           Rh.34         Clone C5         Rhesus         21           Rh.35         Clone F1         Rhesus         23           Rh.36         Clone F3         Rhesus         23           Rh.37         Clone F5                                                                          |             |                                       |        |             | 35           |
| Rh.24         Clone 42.13         Rhesus         MLN         31           Rh.25         Clone 42.15         Rhesus         MLN         28           Rh.26         Clone 223.2         Rhesus         Liver         49           Rh.27         Clone 223.4         Rhesus         Liver         50           Rh.28         Clone 223.5         Rhesus         Liver         51           Rh.29         Clone 223.6         Rhesus         Liver         52           Rh.30         Clone 223.7         Rhesus         Liver         53           Rh.31         Clone Rhesus         Liver         48           223.10         Rhesus         Liver         48           Rh.31         Clone C1         Rhesus         Duo, Kid & Liver         19           Rh.32         Clone C3         Rhesus         20         20           Rh.33         Clone C5         Rhesus         21         21           Rh.34         Clone C5         Rhesus         Liver         22           Rh.36         Clone F1         Rhesus         23         24           Cy.1         Clone F5         Rhesus         24           Cy.1         Clone C1.3 <t< td=""><td></td><td></td><td>Rhesus</td><td></td><td><del></del></td></t<>   |             |                                       | Rhesus |             | <del></del>  |
| Rh.25         Clone 42.15         Rhesus         MLN         28           Rh.26         Clone 223.2         Rhesus         Liver         49           Rh.27         Clone 223.4         Rhesus         Liver         50           Rh.28         Clone 223.5         Rhesus         Liver         51           Rh.29         Clone 223.6         Rhesus         Liver         52           Rh.30         Clone 223.7         Rhesus         Liver         53           Rh.31         Clone Rhesus         Liver         48           223.10         Rhesus         Liver         48           223.10         Rhesus         Liver         20           Rh.32         Clone C1         Rhesus         20           Rh.33         Clone C3         Rhesus         21           Rh.34         Clone C5         Rhesus         21           Rh.35         Clone F1         Rhesus         Liver         22           Rh.36         Clone F3         Rhesus         23           Rh.37         Clone F5         Rhesus         24           Cy.1         Clone 1.3         Cyno         Blood         15           13.3B         Cyno                                                                                         |             |                                       | Rhesus |             |              |
| Rh.26       Clone 223.2       Rhesus       Liver       49         Rh.27       Clone 223.4       Rhesus       Liver       50         Rh.28       Clone 223.5       Rhesus       Liver       51         Rh.29       Clone 223.6       Rhesus       Liver       52         Rh.30       Clone 223.7       Rhesus       Liver       53         Rh.31       Clone Rhesus       Liver       48         223.10       Rhesus       Liver       48         Rh.31       Clone C1       Rhesus       Liver       19         Rh.32       Clone C3       Rhesus       20         Rh.33       Clone C3       Rhesus       21         Rh.34       Clone C5       Rhesus       21         Rh.35       Clone F1       Rhesus       Liver       22         Rh.36       Clone F3       Rhesus       23         Rh.37       Clone F5       Rhesus       24         Cy.1       Clone 1.3       Cyno       Blood       14         Cy.2       Clone Cone       Cyno       Blood       15         13.3B       Cyno       Blood       17         Cy.5       Clone 7.2       Cyno<                                                                                                                                                                 |             |                                       | Rhesus |             |              |
| Rh.27         Clone 223.4         Rhesus         Liver         50           Rh.28         Clone 223.5         Rhesus         Liver         51           Rh.29         Clone 223.6         Rhesus         Liver         52           Rh.30         Clone 223.7         Rhesus         Liver         53           Rh.31         Clone Rhesus         Liver         48           223.10         Rhesus         Liver         19           Kid & Liver         Kid & Liver         20           Rh.32         Clone C3         Rhesus         20           Rh.33         Clone C5         Rhesus         21           Rh.34         Clone C5         Rhesus         22           Rh.35         Clone F1         Rhesus         Liver         22           Rh.36         Clone F3         Rhesus         23           Rh.37         Clone F5         Rhesus         24           Cy.1         Clone 1.3         Cyno         Blood         14           Cy.2         Clone         Cyno         Blood         15           13.3B         Cyno         Blood         17           Cy.5         Clone 27.3         Cyno         Blood                                                                                          |             | <del></del>                           |        |             |              |
| Rh.28         Clone 223.5         Rhesus         Liver         51           Rh.29         Clone 223.6         Rhesus         Liver         52           Rh.30         Clone 223.7         Rhesus         Liver         53           Rh.31         Clone Rhesus         Liver         48           223.10         Liver         48           Rh.32         Clone C1         Rhesus         Spleen, Duo, Kid & Liver           Rh.33         Clone C3         Rhesus         20           Rh.34         Clone C5         Rhesus         21           Rh.35         Clone F1         Rhesus         Liver         22           Rh.36         Clone F3         Rhesus         23           Rh.37         Clone F5         Rhesus         24           Cy.1         Clone 1.3         Cyno         Blood         14           Cy.2         Clone         Cyno         Blood         15           Cy.3         Clone 24.1         Cyno         Blood         17           Cy.5         Clone 7.2         Cyno         Blood         18                                                                                                                                                                                        |             | <del></del>                           |        | Liver       |              |
| Rh.29         Clone 223.6         Rhesus         Liver         52           Rh.30         Clone 223.7         Rhesus         Liver         53           Rh.31         Clone Rhesus         Liver         48           223.10         Rhesus         Liver         19           Rh.32         Clone C1         Rhesus         Spleen, Duo, Kid & Liver         19           Rh.33         Clone C3         Rhesus         20           Rh.34         Clone C5         Rhesus         21           Rh.35         Clone F1         Rhesus         Liver         22           Rh.36         Clone F3         Rhesus         23           Rh.37         Clone F5         Rhesus         24           Cy.1         Clone 1.3         Cyno         Blood         14           Cy.2         Clone Cyno         Blood         15           13.3B         Cy.2         Clone 24.1         Cyno         Blood         16           Cy.4         Clone 27.3         Cyno         Blood         17           Cy.5         Clone 7.2         Cyno         Blood         18                                                                                                                                                            |             |                                       |        | Liver       | 50           |
| Rh.30         Clone 223.7         Rhesus 223.10         Liver 353           Rh.31         Clone 223.10         Rhesus 223.10         Liver 348           Rh.32         Clone C1         Rhesus 320         Spleen, Duo, Kid & Liver 320           Rh.33         Clone C3         Rhesus 321         Rh.34         Clone C5         Rhesus 321           Rh.35         Clone F1         Rhesus 323         Rh.36         Clone F3         Rhesus 323           Rh.37         Clone F5         Rhesus 323         Rh.37         Clone F5         Rhesus 324           Cy.1         Clone 1.3         Cyno 360         14         Cy.2         Clone 1.3         Cyno 360         15           Cy.2         Clone 24.1         Cyno 360         16         15           Cy.3         Clone 27.3         Cyno 360         17           Cy.5         Clone 7.2         Cyno 360         18                                                                                                                                                                                                                                                                                                                                   |             |                                       |        | Liver       |              |
| Rh.31         Clone 223.10         Rhesus 223.10         Liver         48           Rh.32         Clone C1         Rhesus Spleen, Duo, Kid & Liver         19           Rh.33         Clone C3         Rhesus 20         20           Rh.34         Clone C5         Rhesus 21         21           Rh.35         Clone F1         Rhesus Liver 22         22           Rh.36         Clone F3         Rhesus 23         23           Rh.37         Clone F5         Rhesus 24         24           Cy.1         Clone 1.3         Cyno Blood 14         15           Cy.2         Clone Cyno Blood 15         15           13.3B         Cy.3         Clone 24.1         Cyno Blood 16           Cy.4         Clone 27.3         Cyno Blood 17           Cy.5         Clone 7.2         Cyno Blood 18                                                                                                                                                                                                                                                                                                                                                                                                                  |             | <del></del>                           |        | Liver       |              |
| Rh.32   Clone C1   Rhesus   Spleen, Duo, Kid & Liver                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |             |                                       | Rhesus | Liver       | 53           |
| Rh.32         Clone C1         Rhesus         Spleen, Duo, Kid & Liver         19           Rh.33         Clone C3         Rhesus         20           Rh.34         Clone C5         Rhesus         21           Rh.35         Clone F1         Rhesus         Liver         22           Rh.36         Clone F3         Rhesus         23           Rh.37         Clone F5         Rhesus         24           Cy.1         Clone 1.3         Cyno         Blood         14           Cy.2         Clone         Cyno         Blood         15           13.3B         Cyno         Blood         16           Cy.4         Clone 27.3         Cyno         Blood         17           Cy.5         Clone 7.2         Cyno         Blood         18                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Rh.31       | 1 1                                   | Rhesus | Liver       | 48           |
| Rh.33         Clone C3         Rhesus         20           Rh.34         Clone C5         Rhesus         21           Rh.35         Clone F1         Rhesus         Liver         22           Rh.36         Clone F3         Rhesus         23           Rh.37         Clone F5         Rhesus         24           Cy.1         Clone 1.3         Cyno         Blood         14           Cy.2         Clone         Cyno         Blood         15           13.3B         Cy.3         Clone 24.1         Cyno         Blood         16           Cy.4         Clone 27.3         Cyno         Blood         17           Cy.5         Clone 7.2         Cyno         Blood         18                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <u></u>     |                                       |        |             |              |
| Rh.33         Clone C3         Rhesus         20           Rh.34         Clone C5         Rhesus         21           Rh.35         Clone F1         Rhesus         Liver         22           Rh.36         Clone F3         Rhesus         23           Rh.37         Clone F5         Rhesus         24           Cy.1         Clone 1.3         Cyno         Blood         14           Cy.2         Clone         Cyno         Blood         15           13.3B         Cy.3         Clone 24.1         Cyno         Blood         16           Cy.4         Clone 27.3         Cyno         Blood         17           Cy.5         Clone 7.2         Cyno         Blood         18                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Rh.32       | Clone Cl                              | Rhesus | -           | 19           |
| Rh.34         Clone C5         Rhesus         21           Rh.35         Clone F1         Rhesus         Liver         22           Rh.36         Clone F3         Rhesus         23           Rh.37         Clone F5         Rhesus         24           Cy.1         Clone 1.3         Cyno         Blood         14           Cy.2         Clone Cyno         Blood         15           13.3B         Cy.3         Clone 24.1         Cyno         Blood         16           Cy.4         Clone 27.3         Cyno         Blood         17           Cy.5         Clone 7.2         Cyno         Blood         18                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 71.00       |                                       |        | Kid & Liver |              |
| Rh.35         Clone F1         Rhesus         Liver         22           Rh.36         Clone F3         Rhesus         23           Rh.37         Clone F5         Rhesus         24           Cy.1         Clone 1.3         Cyno         Blood         14           Cy.2         Clone Cyno         Blood         15           13.3B         Cy.3         Clone 24.1         Cyno         Blood         16           Cy.4         Clone 27.3         Cyno         Blood         17           Cy.5         Clone 7.2         Cyno         Blood         18                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <del></del> |                                       |        |             | <del></del>  |
| Rh.36         Clone F3         Rhesus         23           Rh.37         Clone F5         Rhesus         24           Cy.1         Clone 1.3         Cyno         Blood         14           Cy.2         Clone         Cyno         Blood         15           13.3B         Cy.3         Clone 24.1         Cyno         Blood         16           Cy.4         Clone 27.3         Cyno         Blood         17           Cy.5         Clone 7.2         Cyno         Blood         18                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |             | <del></del>                           |        |             | <del></del>  |
| Rh.37         Clone F5         Rhesus         24           Cy.1         Clone 1.3         Cyno         Blood         14           Cy.2         Clone Cyno         Blood         15           13.3B         Cyno         Blood         16           Cy.3         Clone 24.1         Cyno         Blood         17           Cy.4         Clone 27.3         Cyno         Blood         18                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |             |                                       |        | Liver       | <del></del>  |
| Cy.1         Clone 1.3         Cyno         Blood         14           Cy.2         Clone         Cyno         Blood         15           13.3B         Cyno         Blood         16           Cy.3         Clone 24.1         Cyno         Blood         17           Cy.4         Clone 27.3         Cyno         Blood         18           Cy.5         Clone 7.2         Cyno         Blood         18                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |             |                                       |        | <del></del> | <del></del>  |
| Cy.2         Clone<br>13.3B         Cyno<br>13.3B         Blood<br>15           Cy.3         Clone 24.1         Cyno<br>16         Cyno<br>17           Cy.4         Clone 27.3         Cyno<br>18         Blood<br>18                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |             |                                       |        |             | <del></del>  |
| 13.3B       Cy.3     Clone 24.1     Cyno     Blood     16       Cy.4     Clone 27.3     Cyno     Blood     17       Cy.5     Clone 7.2     Cyno     Blood     18                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |             |                                       |        |             |              |
| Cy.3         Clone 24.1         Cyno         Blood         16           Cy.4         Clone 27.3         Cyno         Blood         17           Cy.5         Clone 7.2         Cyno         Blood         18                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Cy.2        |                                       | Cyno   | Blood       | 15           |
| Cy.4         Clone 27.3         Cyno         Blood         17           Cy.5         Clone 7.2         Cyno         Blood         18                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |             | <del></del>                           |        | 71. 1       | <del> </del> |
| Cy.5 Clone 7.2 Cyno Blood 18                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |             |                                       |        |             |              |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |             | · · · · · · · · · · · · · · · · · · · |        |             | <del></del>  |
| Cy.o   Cione 10.3   Cyno   Blood   10                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |             |                                       |        |             |              |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <u> </u>    | Cione 16.3                            | Cyno   | R1000       | 1 10         |

|        | Table 1 (cont'd) |        |        |    |  |  |  |  |  |
|--------|------------------|--------|--------|----|--|--|--|--|--|
| bb.l   | Clone 29.3       | Baboon | Blood  | 11 |  |  |  |  |  |
| bb.2   | Clone 29.5       | Baboon | Blood  | 13 |  |  |  |  |  |
| Ch.1   | Clone A3.3       | Chimp  | Blood  | 57 |  |  |  |  |  |
| Ch.2   | Clone A3.4       | Chimp  | Blood  | 54 |  |  |  |  |  |
| Ch.3   | Clone A3.5       | Chimp  | Blood  | 55 |  |  |  |  |  |
| · Ch.4 | Clone A3.7       | Chimp  | Blood, | 56 |  |  |  |  |  |

[0048] A novel NHP clone was made by splicing capsids fragments of two chimp adenoviruses into an AAV2 rep construct. This new clone, A3.1, is also termed Ch.5 [SEQ ID NO:20]. Additionally, the present invention includes two human AAV sequences, termed H6 [SEQ ID NO:25] and H2 [SEQ ID NO:26].

10

15

20

25

30

40

45

[0049] The AAV nucleic acid sequences further encompass the strand which is complementary to the strands provided in the sequences provided in the Sequence Listing [SEQ ID NO:1, 9 - 59, 117-120], nucleic acid sequences, as well as the RNA and cDNA sequences corresponding to the sequences provided in the Sequence Listing [SEQ ID NO:1, 9-59, 117-120], and their complementary strands. Also included in the nucleic acid sequences are natural variants and engineered modifications of the sequences of the Sequence Listing [SEQ ID NO:1, 9 - 59, 117-120], and their complementary strands. Such modifications include, for example, labels which are known in the art, methylation, and substitution of one or more of the naturally occurring nucleotides with a degenerate nucleotide.

[0050] Further included are nucleic acid sequences which are greater than 85%, preferably at least about 90%, more preferably at least about 95%, and most preferably at least about 98 to 99% identical or homologous to the sequences of the invention, including the Sequence Listing [SEQ ID NO:1, 9 - 59, 117-120]. These terms are as defined herein.

[0051] Also included are fragments of the novel AAV sequences identified by the method described herein. Suitable fragments are at least 15 nucleotides in length, and encompass functional fragments, i.e., fragments which are of biological interest. In one embodiment, these fragments are fragments of the novel sequences of the Sequence Listing [SEQ ID NO:1, 9 - 59, 117-120], their complementary strands, cDNA and RNA complementary thereto.

[0052] Examples of suitable fragments are provided with respect to the location of these fragments on AAV1, AAV2, or AAV7. However, using the alignment provided herein (obtained using the Clustal W program at default settings), or similar techniques for generating an alignment with other novel serotypes of the invention, one of skill in the art can readily identify the precise nucleotide start and stop codons for desired fragments.

[0053] Examples of suitable fragments include the sequences encoding the three variable proteins (vp) of the AAV capsid which are alternative splice variants: vp1 [e.g., nt 825 to 3049 of AA V7, SEQ ID NO: 1]; vp2 [e.g., nt 1234 - 3049 of AAV7, SEQ ID NO: 1]; and vp 3 [e.g., nt 1434 - 3049 of AAV7, SEQ ID NO:1]. It is notable that AAV7 has an unusual GTG start codon. With the exception of a few house-keeping genes, such a start codon has not previously been reported in DNA viruses. The start codons for vp1, vp2 and vp3 for other AAV serotypes have been believed to be such that they permit the cellular mechanism of the host cell in which they reside to produce vp1, vp2 and vp3 in a ratio of 10%:10%:80%, respectively, in order to permit efficient assembly of the virion. However, the AAV7 virion has been found to assemble efficiently even with this rare GTG start codon. Thus, the inventors anticipate this it is desirable to alter the start codon of the vp3 of other AAV serotypes to contain this rare GTG start codon, in order to improve packaging efficiency, to alter the virion structure and/or to alter location of epitopes (e.g., neutralizing antibody epitopes) of other AAV serotypes. The start codons may be altered using conventional techniques including, e.g., site directed mutagenesis. The altered AAV virions may be of any selected serotype, composed of a vp 3, and/or optionally, vp 1 and/or vp2 having start codons altered to GTG.

[0054] Other suitable fragments of AAV, include a fragment containing the start codon for the AAV capsid protein [e.g., nt 468 to 3090 of AAV7, SEQ ID NO:1, nt 725 to 3090 of AAV7, SEQ ID NO:1, and corresponding regions of the other AAV serotypes]. Still other fragments of AAV7 and the other novel AAV semtypes identified using the methods described herein include those encoding the rep proteins, including rep 78 [e.g., initiation codon 334 for AAV7], rep 68 [initiation codon nt 334 for AAV7], rep 52 [initiation codon 1006 for AAV7], and rep 40 [initiation codon 1006 for AAV7] Other fragments of interest may include the AAV 5' inverted terminal repeats ITRs, [nt 1 to 107 for AAV7]; the AA V 3' ITRs [nt 4704 to 4721 for AAV7], P19 sequences. AAV P40 sequences, the rep binding site, and the terminal resolute site (TRS). Still other suitable fragments wilt be readily apparent to those of skill in the art.

[0055] In addition to the nucleic acid sequences provided in the figures and Sequence Listing, there are nucleic acid molecules and sequences which are designed to express the amino acid sequences, proteins and peptides of the AAV serotypes of the invention. These include nucleic acid sequences which encode the following novel AAV amino acid sequences: C1 [SEQ ID NO:60], C2 [SEQ ID NO:61], C5 [SEQ ID NO:62], A3-3 [SEQ ID NO:66], A3-7 [SEQ ID NO:67],

A3-4 [SEQ ID NO:68], A3-5 [SEQ ID NO: 69], 3.3b [SEQ ID NO: 62], 223.4 [SEQ ID NO: 73], 223-5 [SEQ ID NO:74], 223-10 [SEQ ID NO:75], 223-2 [SEQ ID NO:76], 223-7 [SEQ ID NO: 77], 223-6 [SEQ ID NO: 78], 44-1 [SEQ ID NO: 79], 44-5 [SEQ ID NO:80], 44-2 [SEQ ID NO:81], 42-15 [SEQ ID NO: 84], 42-8 [SEQ ID NO: 85], 42-13 [SEQ ID NO:86], 42-3A [SEQ ID NO:87], 42-4 [SEQ ID NO:88], 42-5A [SEQ ID NO:89], 42-1B [SEQ ID NO:90], 42-5B [SEQ ID NO:91], 43-1 [SEQ ID NO: 92], 43-12 [SEQ ID NO: 93], 43-5 [SEQ ID NO:94], 43-21 [SEQ ID NO:96], 43-25 [SEQ ID NO: 97], 43-20 [SEQ ID NO:99], 24.1 [SEQ ID NO: 101], 42.2 [SEQ ID NO:102], 7.2 [SEQ ID NO: 103], 27.3 [SEQ ID NO: 104], 16.3 [SEQ ID NO: 105], 42.10 [SEQ ID NO: 106], 42-38 [SEQ ID NO: 107], 42-11 [SEQ ID NO: 108], F1 [SEQ ID NO: 109], F5 [SEQ ID NO: 110], F3 [SEQ ID NO:111], 42-6B [SEQ ID NO: 112], and/or 42-12 [SEQ ID NO: 113], and artificial AAV serotypes generated using these sequences and/or unique fragments thereof.

[0056] As used herein, artificial AAV serotypes include, without limitation. AAV with a non-naturally occurring capsid protein. Such an artificial capsid may be generated by any suitable technique, using a novel AAV sequence (e.g., a fragment of a vp1 capsid protein) in combination with heterologous sequences which may be obtained from another AAV serotype (known or novel), non-contiguous portions of the same AAV serotype, from a non-AAV viral source, or from a non-viral source. An artificial AAV serotype may be, without limitation, a chimeric AAV capsid, a recombinant AAV capsid, or a "humanized" AAV capsid.

#### B. AAV Amino Acid Sequences, Proteins and Peptides

[0057] The invention provides proteins and fragments thereof which are encoded by the nucleic acid sequences of the novel AAV serotypes identified herein, including, e.g., AA V7 [nt 825 to 3049 of AA V7, SEQ ID NO: 1] the other novel serotypes provided herein. Thus, the capsid proteins of the novel serotypes of the invention, including: H6 [SEQ ID NO: 25], H2 [SEQ ID NO: 26], 42-2 [SEQ ID NO:9], 42-8 [SEQ ID NO:27], 42-15 [SEQ ID NO:28], 42-5b [SEQ ID NO: 29], 42-1b [SEQ ID NO:30]; 42-13 [SEQ ID NO: 31], 42-3a [SEQ ID NO: 32], 42-4 [SEQ ID NO:33], 42-5a [SEQ ID NO: 34], 42-10 [SEQ ID NO:35], 42-3b [SEQ ID NO: 36], 42-11 [SEQ ID NO: 37], 42-6b [SEQ ID NO:38], 43-1 [SEQ ID NO: 39], 43-5 [SEQ ID NO: 40], 43-12 [SEQ ID NO:41], 43-20 [SEQ ID NO:42], 43-21 [SEQ ID NO: 43], 43-23 [SEQ ID NO:44], 43-25 [SEQ ID NO: 45], 44.1 [SEQ ID NO:47], 44.5 [SEQ ID NO:47], 223.10 [SEQ ID NO:48], 223.2 [SEQ ID NO:49], 223.4 [SEQ ID NO:50], 223.5 [SEQ ID NO:51], 223.6 [SEQ ID NO:57], 42.12 [SEQ ID NO: 58], and 44.2 [SEQ ID NO: 59], can be readily generated using conventional techniques from the open reading frames provided for the above-listed clones.

[0058] The sequences, proteins, and fragments may be produced by any suitable means, including recombinant production, chemical synthesis, or other synthetic means. Such production methods are within the knowledge of those of skill in the art.

#### IV. Production of rAAV with novel AAV capsids

[0059] Novel, wild-type AAV serotypes can be identified by the invention, the sequences of which wild-type AAV serotypes are free of DNA and/or cellular material with these viruses are associated in nature. In another aspect, the present invention provides molecules which utilize the novel AAV sequences of the invention, including fragments thereof, for production of molecules useful in delivery of a heterologous gene or other nucleic acid sequences to a target cell.

[0060] The following examples illustrate several aspects and embodiments of the invention.

#### **EXAMPLES**

40

Example 1: PCR amplification, cloning and characterization of novel AAV sequences.

[0061] Tissues from nonhuman primates were screened for AAV sequences using a PCR method based on oligonucleotides to highly conserved regions of known AAVs. A stretch of AAV sequence spanning 2886 to 3143 bp of AAV1 [SEQ ID NO:6] was selected as a PCR amplicon in which a hypervariable region of the capsid protein (Cap) that is unique to each known AAV serotype, which is termed herein a "signature region," is flanked by conserved sequences. In later analysis, this signature region was shown to be located between conserved residues spanning hypervariable region 3.

[0062] An initial survey of peripheral blood of a number of nonhuman primate species revealed detectable AAV in a subset of animals from species such as rhesus macaques, cynomologous macaques, chimpanzees and baboons. However, there were no AAV sequences detected in some other species tested, including Japanese macaques, pig-tailed macaques and squirrel monkeys. A more extensive analysis of vector distribution was conducted in tissues of rhesus monkeys of the University of Pennsylvania and Tulane colonies recovered at necropsy. This revealed AAV sequence throughout a wide array of tissues.

## A. Amplification of an AAV signature region

[0063] DNA sequences of AAV1-6 and AAVs isolated from Goose and Duck were aligned to each other using "Clustal W" at default settings. Sequence similarities among AAVs were compared.

[0064] In the line of study, a 257 bp region spanning 2886 bp to 3143 bp of AAV1 [SEQ ID NO: 6], and the corresponding region in the genomes of AAV 2-6 genomes was identified by the inventors. This region is located with the AAV capsid gene and has highly conserved sequences among at both 5' and 3' ends and is relatively variable sequence in the middle. In addition, this region contains a DrallI restriction enzyme site (CACCACGTC, SEQ ID NO:15). The inventors have found that this region serves as specific signature for each known type of AAV DNA. In other words, following PCR reactions, digestion with endonucleases that are specific to each known serotypes and gel electrophoresis analysis, this regions can be used to definitively identify amplified DNA as being from serotype 1, 2, 3, 4, 5, 6, or another serotype.

[0065] The primers were designed, validated and PCR conditions optimized with AAV1, 2 and 5 DNA controls. The primers were based upon the sequences of AAV2: 5' primer, 1S: bp 2867-2891 of AAV2 (SEQ ID NO:7) and 3' primer,

18as, bp 3095-3121 of AAV2 (SEQ ID NO:7).

[0066] Cellular DNAs from different tissues including blood, brain, liver, lung, testis, etc. of different rhesus monkeys were studied utilizing the strategy described above. The results revealed that DNAs from different tissues of these monkeys gave rise to strong PCR amplifications. Further restriction analyses of PCR products indicated that they were amplified from AAV sequences different from any published AAV sequences.

[0067] PCR products (about 255 bp in size) from DNAs of a variety of monkey tissues have been cloned and sequenced. Bioinformatics study of these novel AAV sequences indicated that they are novel AAV sequences of capsid gene and distinct from each other. Multiple sequence alignment analysis was performed using the Clustal W (1.81) program. The percentage of sequence identity between the signature regions of AAV 1-7 and AAV 10-12 genomes is provided below.

Table 1. Sequences for Analysis

| Sequence# | AAV Serotype   | Size (bp) |
|-----------|----------------|-----------|
|           | 75 tr 55.5typ5 | C.20 (SP) |
| 1         | AAV1           | 258       |
| 2         | AAV2           | 255       |
| 3         | AAV3           | 255       |
| 4         | AAV4           | 246       |
| 5         | AAV5           | 258       |
| 6         | AAV6           | 258       |
| 7         | AAV7           | 258       |
| 10        | AAV10          | 255       |
| 11        | AAV11          | 258       |
| 12        | AAV12          | 255       |

Table 3. Pairwise Alignment (Percentage of Identity)

|       | AAV2 | AAV3 | AAV4 | AAV5 | AAV6 | AAV7 | AAV10 | AAV11 | AAV12 |
|-------|------|------|------|------|------|------|-------|-------|-------|
| AAV1  | 90   | 90   | 81   | 76   | 97   | 91   | 93    | 94    | 93    |
| AAV2  |      | 93   | 79   | 78   | 90   | 90   | 93    | 93    | 92    |
| AAV3  |      |      | 80   | 76   | 90   | 92   | 92    | 92    | 92    |
| AAV4  |      |      |      | 76   | 81   | 84   | 82    | 81    | 79    |
| AAV5  |      |      |      |      | 75   | 78   | 79    | 79    | 76    |
| AAV6  |      |      |      |      |      | 91   | 92    | 94    | 94    |
| AAV7  |      |      |      |      |      |      | 94    | 92    | 92    |
| AAV10 |      |      |      |      |      |      |       | 95    | 93    |

20

15

30

35

40

45

50

#### Table continued

|       | AAV2 | AAV3 | AAV4 | AAV5 | AAV6 | AAV7 | AAV10 | AAV11 | AAV12 |
|-------|------|------|------|------|------|------|-------|-------|-------|
| AAV11 |      |      |      |      |      |      |       | _     | 94    |

[0068] Over 300 clones containing novel AAV serotype sequences that span the selected 257 bp region were isolated and sequenced. Bioinformatics analysis of these 300+ clones suggests that this 257 bp region is critical in serving as a good land marker or signature sequence for quick isolation and identification of novel AAV serotype.

B. Use of the signature region for PCR amplification.

5

[0069] The 257 bp signature region was used as a PCR anchor to extend PCR amplifications to 5' of the genome to cover the junction region of rep and cap genes (1398 bp - 3143 bp, SEQ ID NO:6) and 3' of the genome to obtain the entire cap gene sequence (2866 bp - 4600 bp, SEQ ID NO:6). PCR amplifications were carried out using the standard conditions, including denaturing at 95°C for 0.5-1 min, annealing at 60-65°C for 0.5-1 min and extension at 72° C for I min per kb with a total number of amplification cycles ranging from 28 to 42.

[0070] Using the aligned sequences as described in "A", two other relative conserved regions were identified in the sequence located in 3' end of rep genes and 5' to the 257 bp region and in the sequence down stream of the 257 bp fragment but before the AAV' 3 ITR. Two sets of new primers were designed and PCR conditions optimized for recovery of entire capsid and a part of rep sequences of novel AAV serotypes. More specifically, for the 5' amplification, the 5' primer, AV1Ns, was GCTGCGTCAACTGGACCAATGAGAAC [nt 1398-1423 of AAV1, SEQ ID NO:6] and the 3' primer was 18as, identified above. For the 3' amplification, the 5' primer was 1s, identified above, and the 3' primer was AV2Las, TCGTTTCAGTTGAACTTTGGTCTCTGCG [nt 4435-4462 of AAV2, SEQ ID NO:7].

[0071] In these PCR amplifications, the 257 bp region was used as a PCR anchor and land marker to generate overlapping fragments to construct a complete capsid gene by fusion at the Dralll site in the signature region following amplification of the 5' and 3' extension fragments obtained as described herein. More particularly, to generate the intact AAV7 cap gene, the three amplification products (a) the sequences of the signature region; (b) the sequences of the 5' extension; and (c) the sequences of the 3' extension were cloned into a pCR4-Topo [Invitrogen] plasmid backbone according to manufacturer's instructions. Thereafter, the plasmids were digested with Dralll and recombined to form an intact cap gene.

[0072] In this line of work, about 80 % of capsid sequences of AAV7 and AAV 8 were isolated and analyzed. Another novel serotype, AAV9, was also discovered from Monkey #2.

[0073] Using the PCR conditions described above, the remaining portion of the rep gene sequence for AAV7 is isolated and cloned using the primers that amplify 108 bp to 1461 bp of AAV genome (calculated based on the numbering of AAV2, SEQ ID NO:7). This clone is sequenced for construction of a complete AAV7 genome without ITRs.

#### C. Direct Amplification of 3.1 kb Cap fragment

[0074] To directly amplify a 3.1 kb full-length Cap fragment from NHP tissue and blood DNAs, two other highly conserved regions were identified in AAV genomes for use in PCR amplification of large fragments. A primer within a conserved region located in the middle of the rep gene was selected (AV1ns: 5' GCTGCGTCAACTGGACCAATGAGAAC 3', nt 1398-1423 of SEQ ID NO:6) in combination with the 3' primer located in another conserved region downstream of the Cap gene (AV2cas: 5' CGCAGAGACCAAAGTTCAACTGAAACGA 3', SEQ ID NO:7) for amplification of full-length cap fragments. The PCR products were Topo-cloned according to manufacturer's directions (Invitrogen) and sequence analysis was performed by Qiagengenomics (Qiagengenomics, Seattle, WA) with an accuracy of ≥ 99.9%. A total of 50 capsid clones were isolated and characterized. Among them, 37 clones were derived from Rhesus macaque tissues (rh.1 - rh.37), 6 clones from cynomologous macaques (cy.1 - cy.6), 2 clones from Baboons (bb.1 and bb.2) and 5 clones from Chimps (ch.1 - ch.5).

[0075] To rule out the possibility that sequence diversity within the novel AAV family was not an artifact of the PCR, such as PCR-mediated gene splicing by overlap extension between different partial DNA templates with homologous sequences, or the result of recombination process in bacteria, a series of experiments were performed under identical conditions for VP1 amplification-using total cellular DNAs. First, intact AAV7 and AAV8 plasmids were mixed at an equal molar ratio followed by serial dilutions. The serially diluted mixtures were used as templates for PCR amplification of 3.1 kb VP1 fragments using universal primers and identical PCR conditions to that were used for DNA amplifications to see whether any hybrid PCR products were generated. The mixture was transformed into bacteria and isolated transformants to look for hybrid clones possibly derived from recombination process in bacterial cells. In a different experiment, we restricted AAV7 and AAV8 plasmids with Msp I, Ava I and Hael, all of which cut both genomes multiple times at different

positions, mixed the digestions in different combinations and used them for PCR amplification of VP1 fragments under the same conditions to test whether any PCR products could be generated through overlap sequence extension of partial AAV sequences. In another experiment, a mixture of gel purified 5' 1.5 kb AAV7 VP1 fragment and 3' 1.7 kb AAV8 VP1 fragment with overlap in the signature region was serially diluted and used for PCR amplification in the presence and absence of 200 ng cellular DNA extracted from a monkey cell line that was free of AAV sequences by TaqMan analysis. None of these experiments demonstrated efficient PCR-mediated overlap sequence production under the conditions of the genomic DNA Cap amplification (data not shown). As a further confirmation, 3 pairs of primers were designed, which were located at different HVRs, and were sequence specific to the variants of clone 42s from Rhesus macaque F953, in different combinations to amplify shorter fragments from mesenteric lymph node (MLN) DNA from F953 from which clone 42s were isolated. All sequence variations identified in full-length Cap clones were found in these short fragments (data not shown).

Example 2: Adeno-Associated Viruses Undergo Substantial Evolution in Primates During Natural Infections

15

20

30

[0076] Sequence analysis of selected AAV isolates revealed divergence throughout the genome that is most concentrated in hypervariable regions of the capsid proteins. Epidemiologic data indicate that all known serotypes are endemic to primates, although isolation of clinical isolates has been restricted to AAV2 and AAV3 from anal and throat swabs of human infants and AAV5 from a human condylomatous wart. No known clinical sequalae have been associated with AAV infection.

[0077] In an attempt to better understand the biology of AAV, nonhuman primates were used as models to characterize the sequiae of natural infections. Tissues from nonhuman primates were screened for AAV sequences using the PCR method of the invention based on oligonucleotides to highly conserved regions of known AAVs (see Example 1). A stretch of AAV sequence spanning 2886 to 3143 bp of AAV1 [SEQ ID NO:6] was selected as a PCR amplicon in which conserved sequences are flanked by a hypervariable region that is unique to each known AAV serotype, termed herein a "signature region."

[0078] An initial survey of peripheral blood of a number of nonhuman primate species including rhesus monkeys, cynomologous monkeys, chimpanzees, and baboons revealed detectable AAV in a subset of animals from all species. A more extensive analysis of vector distribution was conducted in tissues of rhesus monkeys of the University of Pennsylvania and Tulane colonies recovered at necropsy. This revealed AAV sequence throughout a wide array of tissues. [0079] The amplified signature sequences were subcloned into plasmids and individual transformants were subjected to sequence analysis. This revealed substantial variation in nucleotide sequence of clones derived from different animals. Variation in the signature sequence was also noted in clones obtained within individual animals. Tissues harvested from two animals in which unique signature sequences were identified (i.e., colon from 98E044 and heart from 98E056) were further characterized by expanding the sequence amplified by PCR using oligonucleotides to highly conserved sequences. In this way, complete proviral structures were reconstructed for viral genomes from both tissues as described herein. These proviruses differ from the other known AAVs with the greatest sequence divergence noted in regions of the Cap gene.

[0080] Additional experiments were performed to confirm that AAV sequences resident to the nonhuman primate tissue represented proviral genomes of infectious virus that is capable of being rescued and form virions. Genomic DNA from liver tissue of animal 98E056, from which AAV8 signature sequence was detected, was digested with an endonuclease that does not have a site within the AAV sequence and transfected into 293 cells with a plasmid containing an E1 deleted genome of human adenovirus serotype 5 as a source of helper functions. The resulting lysate was passaged on 293 cells once and the lysate was recovered and analyzed for the presence of AAV Cap proteins using a broadly reacting polyclonal antibody to Cap proteins and for the presence and abundance of DNA sequences from the PCR amplified AAV provirus from which AAV8 was derived. Transfection of endonuclease restricted heart DNA and the adenovirus helper plasmid yielded high quantities of AAV8 virus as demonstrated by the detection of Cap proteins by Western blot analysis and the presence of 10<sup>4</sup> AAV8 vector genomes per 293 cell. Lysates were generated from a large-scale preparation and the AAV was purified by cesium sedimentation. The purified preparation demonstrated 26 nm icosohedral structures that look identical to those of AAV serotype 2. Transfection with the adenovirus helper alone did not yield AAV proteins or genomes, ruling out contamination as a source of the rescued AAV.

[0081] To further characterize the inter and intra animal variation of AAV signature sequence, selected tissues were subjected to extended PCR to amplify entire Cap open reading frames.

[0082] The resulting fragments were cloned into bacterial plasmids and individual transformants were isolated and fully sequenced. This analysis involved mesenteric lymph nodes from three rhesus monkeys (Tulane/V223 - 6 clones; Tulane/T612 - 7 clones; Tulane/F953 - 14 clones), liver from two rhesus monkeys (Tulane/V251 - 3 clones; Penn/00E033 - 3 clones), spleen from one rhesus monkey (Penn/97E043 - 3 clones), heart from one rhesus monkey (IHGT/98E046-1 clone) and peripheral blood from one chimpanzee (New Iberia/X133 - 5 clones), six cynomologous macaques (Charles River/A1378, A3099, A3388, A3442, A2821, A3242 - 6 clones total) and one Baboon (SFRB/8644 - 2 clones). Of the

50 clones that were sequenced from 15 different animals, 30 were considered non-redundant based on the finding of at least 7 amino acid differences from one another. The non-redundant VP1 clones are numbered sequentially as they were isolated, with a prefix indicating the species of non-human primate from which they were derived. The structural relationships between these 30 non-redundant clones and the previously described 8 AAV serotypes were determined using the SplitsTree program [Huson, D. H. SplitsTree: analyzing and visualizing evolutionary data. *Bioinformatics* 14, 68-73 (1998)] with implementation of the method of split decomposition. The analysis depicts homoplasy between a set of sequences in a tree-like network rather than a bifurcating tree. The advantage is to enable detection of groupings that are the result of convergence and to exhibit phylogenetic relationships even when they are distorted by parallel events. Extensive phylogenetic research will be required in order to elucidate the AAV evolution, whereas the intention here only is to group the different clones as to their sequence similarity.

[0083] To confirm that the novel VP1 sequences were derived from infectious viral genomes, cellular DNA from tissues with high abundance of viral DNA was restricted with an endonuclease that should not cleave within AAV and transfected into 293 cells, followed by infection with adenovirus. This resulted in rescue and amplification of AAV genomes from DNA of tissues from two different animals (data not shown).

[0084] VP1 sequences of the novel AAVs were further characterized with respect to the nature and location of amino acid sequence variation. All 30 VP1 clones that were shown to differ from one another by greater than 1% amino acid sequence were aligned and scored for variation at each residue. An algorithm developed to determine areas of sequence divergence yielded 12 hypervariable regions (HVR) of which 5 overlap or are part of the 4 previously described variable regions [Kotin, cited above; Rutledge, cited above]. The threefold-proximal peaks contain most of the variability (HVR5-10). Interestingly the loops located at the 2 and 5 fold axis show intense variation as well. The HVRs 1 and 2 occur in the N-terminal portion of the capsid protein that is not resolved in the X-ray structure suggesting that the N-terminus of the VP1 protein is exposed on the surface of the virion.

[0085] Real-time PCR was used to quantify AAV sequences from tissues of 21 rhesus monkeys using primers and probes to highly conserved regions of Rep (one set) and Cap (two sets) of known AAVs. Each data point represents analysis from tissue DNA from an individual animal. This confirmed the wide distribution of AAV sequences, although the quantitative distribution differed between individual animals. The source of animals and previous history or treatments did not appear to influence distribution of AAV sequences in rhesus macaques. The three different sets of primers and probes used to quantify AAV yielded consistent results. The highest levels of AAV were found consistently in mesenteric lymph nodes at an average of 0.01 copies per diploid genome for 13 animals that were positive. Liver and spleen also contained high abundance of virus DNA. There were examples of very high AAV, such as in heart of rhesus macaque 98E056, spleen of rhesus macaque 97E043 and liver of rhesus macaque RQ4407, which demonstrated 1.5, 3 and 20 copies of AAV sequence per diploid genome respectively. Relatively low levels of virus DNA were noted in peripheral blood mononuclear cells, suggesting the data in tissue are not due to resident blood components (data not shown). It should be noted that this method would not necessarily capture all AAVs resident to the nonhuman primates since detection requires high homology to both the oligonucleotides and the real time PCR probe. Tissues from animals with high abundance AAV DNA was further analyzed for the molecular state of the DNA, by DNA hybridization techniques, and its cellular distribution, by *in situ* hybridization.

30

[0086] The kind of sequence variation revealed in AAV proviral fragments isolated from different animals and within tissues of the same animals is reminiscent of the evolution that occurs for many RNA viruses during pandemics or even within the infection of an individual. In some situations the notion of a wild-type virus has been replaced by the existence of swarms of quasispecies that evolve as a result of rapid replication and mutations in the presence of selective pressure. One example is infection by HIV, which evolves in response to immunologic and pharmacologic pressure. Several mechanisms contribute to the high rate of mutations in RNA viruses, including low fidelity and lack of proof reading capacity of reverse transcriptase and non-homologous and homologous recombination.

[0087] Evidence for the formation of quasispecies of AAV was illustrated in this study by the systematic sequencing of multiple cloned proviral fragments. In fact, identical sequences could not be found within any extended clones isolated between or within animals. An important mechanism for this evolution of sequence appears to be a high rate of homologous recombination between a more limited number of parenteral viruses. The net result is extensive swapping of hypervariable regions of the Cap protein leading to an array of chimeras that could have different tropisms and serologic specificities (i.e., the ability to escape immunologic responses especially as it relates to neutralizing antibodies). Mechanisms by which homologous recombination could occur are unclear. One possibility is that + and - strands of different single stranded AAV genomes anneal during replication as has been described during high multiplicity of infections with AAV recombinants. It is unclear if other mechanisms contribute to sequence evolution in AAV infections. The overall rate of mutation that occurs during AAV replication appears to be relatively low and the data do not suggest high frequencies of replication errors. However, substantial rearrangements of the AAV genome have been described during lytic infection leading to the formation of defective interfering particles. Irrespective of the mechanisms that lead to sequence divergence, with few exceptions, vp1 structures of the quasispecies remained intact without frameshifts or nonsense mutations suggesting that competitive selection of viruses with the most favorable profile of fitness contribute to the population

dynamics.

10

20

- 25

30

35

40

50

[0088] These studies have implications in several areas of biology and medicine. The concept of rapid virus evolution, formerly thought to be a property restricted to RNA viruses, should be considered in DNA viruses, which classically have been characterized by serologic assays. It will be important in terms of parvoviruses to develop a new method for describing virus isolates that captures the complexity of its structure and biology, such as with HIV, which are categorized as general families of similar structure and function called Clades. An alternative strategy is to continue to categorize isolates with respect to serologic specificity and develop criteria for describing variants within serologic groups.

Example 3: Vectorology of recombinant AAV genomes equipped with AAV2 ITRs using chimeric plasmids containing AAV2 rep and novel AAV cap genes for scrological and gene transfer studies in different animal models.

[0089] Chimeric packaging constructs are generated by fusing AAV2 rep with cap sequences of novel AAV serotypes. These chimeric packaging constructs are used, initially, for pseudotyping recombinant AAV genomes carrying AAV2 ITRs by triple transfection in 293 cell using Ad5 helper plasmid. These pseudotyped vectors are used to evaluate performance in transduction-based serological studies and evaluate gene transfer efficiency of novel AAV serotypes in different animal models including NHP and rodents, before intact and infectious viruses of these novel serotypes are isolated.

#### A. pAAV2GFP

[0090] The AAV2 plasmid which contains the AAV2 ITRs and green fluorescent protein expressed under the control of a constitutitive promoter. This plasmid contains the following elements: the AAV2 ITRs, a CMV promoter, and the GFP coding sequences.

#### B. Cloning of trans plasmid

[0091] To construct the chimeric trans-plasmid for production of recombinant pseudotyped AAV7 vectors, p5E18 plasmid (Xiao et al., 1999, J. Virol 73:3994-4003) was partially digested with Xho I to linearize the plasmid at the Xho I site at the position of 3169 bp only. The Xho I cut ends were then filled in and ligated back. This modified p5E18 plasmid was restricted with Xba I and Xho I in a complete digestion to remove the AAV2 cap gene sequence and replaced with a 2267 bp Spe I/Xho I fragment containing the AAV7 cap gene which was isolated from pCRAAV7 6-5+15-4 plasmid. [0092] The resulting plasmid contains the AAV2 rep sequences for Rep78/68 under the control of the AAV2 P5 promoter, and the AAV2 rep sequences for Rep52/40 under the control of the AAV2 P19 promoter. The AAV7 capsid sequences are under the control of the AAV2 P40 promoter, which is located within the Rep sequences. This plasmid further contains a spacer 5' of the rep ORF.

#### C. Production of Pseudotyped rAAV

[0093] The rAAV particles (AAV2 vector in AAV7 capsid) are generated using an adenovirus-free method. Briefly, the cis plasmid (pAAV2.1 lacZ plasmid containing AAV2 ITRs), and the trans plasmid pCRAAV7 6-5+15-4 (containing the AAV2 rep and AAV7 cap) and a helper plasmid, respectively, were simultaneously co-transfected into 293 cells in a ratio of 1:1:2 by calcium phosphate precipitation.

[0094] For the construction of the pAd helper plasmids, pBG 10 plasmid was purchased from Microbix (Canada). A RsrII fragment containing L2 and L3 was deleted from pBHG10, resulting in the first helper plasmid, pAd $\Delta$ F13. Plasmid Ad $\Delta$ F1 was constructed by cloning Asp700/SalI fragment with a PmeI/Sgfl deletion, isolating from pBHG10, into Bluescript. MLP, L2, L2 and L3 were deleted in the pAd $\Delta$ F1. Further deletions of a 2.3 kb NruI fragment and, subsequently, a 0.5 kb RsrII/NruI fragment generated helper plasmids pAd $\Delta$ F5 and pAd $\Delta$ F6, respectively. The helper plasmid, termed p $\Delta$ F6, provides the essential helper functions of E2a and E4 ORF6 not provided by the E1-expressing helper ceII, but is deleted of adenoviral capsid proteins and functional E1 regions).

[0095] Typically, 50 μg of DNA (cis:trans:helper) was transfected onto a 150 mm tissue culture dish. The 293 cells were harvested 72 hours post-transfection, sonicated and treated with 0.5% sodium deoxycholate (37°C for 10 min.) Cell lysates were then subjected to two rounds of a CsCl gradient. Peak fractions containing rAAV vector are collected, pooled and dialyzed against PBS.

Example 4: Creation of infectious clones carrying intact novel AAV serotypes for study of basic virology in human and NHP derived cell lines and evaluation of pathogenesis of novel AAV serotypes in NHP and other animal models.

[0096] To achieve this goal, the genome walker system is employed to obtain 5' and 3' terminal sequences (ITRs)

and complete construction of clones containing intact novel AAV serotype genomes.

[0097] Briefly, utilizing a commercially available Universal Genome Walker Kit [Clontech], genomic DNAs from monkey tissues or cell lines that are identified as positive for the presence of AAV7 sequence are digested with Dra I, EcoR V, Pvu II and Stu I endonucleases and ligated to Genome Walker Adaptor to generate 4 individual Genome Walker Libraries (GWLs). Using DNAs from GWLs as templates, AAV7 and adjacent genomic sequences will be PCR-amplified by the adaptor primer 1 (API, provided in the kit) and an AAV7 specific primer 1, followed by a nested PCR using the adaptor primer 2 (AP2) and another AAV7 specific primer 2, both of which are internal to the first set of primers. The major PCR products from the nested PCR are cloned and characterized by sequencing analysis.

[0098] In this experiment, the primers covering the 257 bp or other signature fragment of a generic AAV genome are used for PCR amplification of cellular DNAs extracted from Human and NHP derived cell lines to identify and characterize latent AAV sequences. The identified latent AAV genomes are rescued from the positive cell lines using adenovirus helpers of different species and strains.

[0099] To isolate infectious AAV clones from NHP derived cell lines, a desired cell line is obtained from ATCC and screened by PCR to identify the 257 bp amplicon, i.e., signature region of the invention. The 257 bp PCR product is cloned and serotyped by sequencing analysis. For these cell lines containing the AAV7 sequence, the cells are infected with SV-15, a simian adenovirus purchased from ATCC, human Ad5 or transfected with plasmid construct housing the human Ad genes that are responsible for AAV helper functions. At 48 hour post infection or transfection, the cells are harvested and Hirt DNA is prepared for cloning of AAV7 genome following Xiao et al., 1999, J. Virol, 73:3994-4003.

## 20 Example 5 - Production of AAV Vectors

[0100] A pseudotyping strategy similar to that of Example 3 for AAV1/7 was employed to produce AAV2 vectors packaged with AAV1, AAV5 and AAV8 capsid proteins. Briefly, recombinant AAV genomes equipped with AAV2 ITRs were packaged by triple transfection of 293 cells with cis-plasmid, adenovirus helper plasmid and a chimeric packaging construct where the AAV2 rep gene is fused with cap genes of novel AAV serotypes. To create the chimeric packaging constructs, the Xho I site of p5E18 plasmid at 3169 bp was ablated and the modified plasmid was restricted with Xba I and Xho I in a complete digestion to remove the AAV2 cap gene and replace it with a 2267 bp Spe I/Xho I fragment containing the AAV8 cap gene [Xiao, W., et al., (1999) J Virol 73, 3994-4003]. A similar cloning strategy was used for creation of chimeric packaging plasmids of AAV2/1 and AAV2/5. All recombinant vectors were purified by the standard CsCl<sub>2</sub> sedimentation method except for AAV2/2, which was purified by single step heparin chromatography.

[0101] Genome copy (GC) titers of AAV vectors were determined by TaqMan analysis using probes and primers targeting SV40 poly A region as described previously [Gao, G., et al., (2000) *Hum Gene Ther* 11, 2079-91].

[0102] Vectors were constructed for each serotype for a number of *in vitro* and *in vivo* studies. Eight different transgene cassettes were incorporated into the vectors and recombinant virions were produced for each serotype. The recovery of virus, based on genome copies, is summarized in Table 4 below. The yields of vector were high for each serotype with no consistent differences between serotypes. Data presented in the table are average genome copy yields with standard deviation x 10<sup>13</sup> of multiple production lots of 50 plate (150 mm) transfections.

Table 4 Production of Recombinant Vectors

|          | Table 4. Floudction of Recombinant Vectors |                       |                       |                   |                        |  |  |  |  |  |
|----------|--------------------------------------------|-----------------------|-----------------------|-------------------|------------------------|--|--|--|--|--|
|          | AAV2/1                                     | AAV2/2                | AAV2/5                | AAV2/7            | AAV2/8                 |  |  |  |  |  |
| CMV LacZ | 7.30 ± 4.33 (n=9)                          | 4.49 ± 2.89 (n=6)     | 5.19 ± 5.19 (n=8)     | 3.42 (n=1)        | 0.87 (n=1)             |  |  |  |  |  |
| CMV EGFP | 6.43 ± 2.42 (n=2)                          | 3.39 ± 2.42 (n=2)     | 5.55 ± 6.49 (n=4)     | 2.98 ± 2.66 (n=2) | 3.74 ± 3.88 (n=2)      |  |  |  |  |  |
| TBG LacZ | 4.18 (n=1)                                 | 0.23 (n=1)            | 0.704 ± 0.43<br>(n=2) | 2.16 (n=1)        | 0.532 (n=1)            |  |  |  |  |  |
| Alb A1AT | 4.67 ± 0.75 (n=2)                          | 4.77 (n=1)            | 4.09 (n=1)            | 5.04 (n=1)        | 2.02 (n=1)             |  |  |  |  |  |
| CB A1AT  | 0.567 (n=1)                                | 0.438 (n=1)           | 2.82 (n=1)            | 2.78 (n=1)        | 0.816 ± 0.679<br>(n=2) |  |  |  |  |  |
| TBG rhCG | 8.51 ± 6.65 (n=6)                          | 3.47 ± 2.09 (n=5)     | 5.26 ± 3.85 (n=4)     | 6.52 ± 3.08 (n=4) | 1.83 ± 0.98 (n=5)      |  |  |  |  |  |
| TBG cFIX | 1.24 ± 1.29 (n=3)                          | 0.63 ± 0.394<br>(n=6) | 3.74 ± 2.48 (n=7)     | 4.05 (n=1)        | 15.8 ± 15.0 (n=5)      |  |  |  |  |  |

Example 6 - Serologic Analysis of Pseudotyped Vectors

[0103] C57BL/6 mice were injected with vectors of different serotypes of AAVCBA1AT vectors intramuscularly (5 x

55

5

15

30

35

40

45

50

10<sup>11</sup> GC) and serum samples were collected 34 days later. To test neutralizing and cross-neutralizing activity of sera to each serotype of AAV, sera was analyzed in a transduction based neutralizing antibody assay [Gao, G. P., et al., (1996) *J Virol* 70, 8934-43]. More specifically, the presence of neutralizing antibodies was determined by assessing the ability of serum to inhibit transduction of 84-31 cells by reporter viruses (AAVCMVEGFP) of different serotypes. Specifically, the reporter virus AAVCMVEGFP of each serotype [at multiplicity of infection (MOI) that led to a transduction of 90% of indicator cells] was pre-incubated with heat-inactivated serum from animals that received different serotypes of AAV or from naïve mice. After 1-hour incubation at 37° C, viruses were added to 84-31 cells in 96 well plates for 48 or 72- hour, depending on the virus serotype. Expression of GFP was measured by Fluorolmagin (Molecular Dynamics) and quantified by Image Quant Software. Neutralizing antibody titers were reported as the highest serum dilution that inhibited transduction to less than 50%.

[0104] The availability of GFP expressing vectors simplified the development of an assay for neutralizing antibodies that was based on inhibition of transduction in a permissive cell line (i.e., 293 cells stably expressing E4 from Ad5). Sera to selected AAV serotypes were generated by intramuscular injection of the recombinant viruses. Neutralization of AAV transduction by 1:20 and 1:80 dilutions of the antisera was evaluated (See Table 5 below). Antisera to AAV1, AAV2, AAV5 and AAV8 neutralized transduction of the serotype to which the antiserum was generated (AAV5 and AAV8 to a lesser extent than AAV1 and AAV2) but not to the other serotype (i.e., there was no evidence of cross neutralization suggesting that AAV 8 is a truly unique serotype).

Table 5. Serological Analysis of New AAV Serotypes.

20

25

30

40

45

|         |                     |       | % Infection on 84-31 cells with AAVCMVEGFP virus: |       |           |                 |      |                 |      |                |      |
|---------|---------------------|-------|---------------------------------------------------|-------|-----------|-----------------|------|-----------------|------|----------------|------|
|         |                     | AAI   | /2/1                                              | AAV   | /2/2      | AA              | V2/5 | AAV             | 2/7  | AAV2/8         |      |
|         |                     | Serum | dilution:                                         | Serum | filution: | Serum dilution: |      | Serum dilution: |      | Serum dilution |      |
| Sera:   | Immunization Vector | 1/20  | 1/80                                              | 1/20  | 1/80      | 1/20            | 1/80 | 1/20            | 1/80 | 1/20           | 1/80 |
| Group 1 | AAV2/1              | 0     | 0                                                 | 100   | 100       | 100             | 100  | 100             | 100  | 100            | 100  |
| Group 2 | AAV2/2              | 100   | 100                                               | 0     | 0         | 100             | 100  | 100             | 100  | 100            | 100  |
| Group 3 | AAV2/5              | 100′  | 100                                               | 100   | 100       | 16.5            | 16.5 | 100             | 100  | 100            | 100  |
| Group 4 | AAV2/7              | 100   | 100                                               | 100   | 100       | 100             | 100  | 61.5            | 100  | 100            | 100  |
| Group 5 | AAV2/8              | 100   | 100                                               | 100   | 100       | 100             | 100  | 100             | .100 | 26.3           | 60   |

[0105] Human sera from 52 normal subjects were screened for neutralization against selected serotypes. No serum sample was found to neutralize AAV2/7 and AAV2/8 while AAV2/2 and AAV2/1 vectors were neutralized in 20% and 10% of sera, respectively. A fraction of human pooled IgG representing a collection of 60,000 individual samples did not neutralize AAV2/7 and AAV2/8, whereas AAV2/2 and AAV2/1 vectors were neutralized at titers of serum equal to 1/1280 and 1/640, respectively.

Example 7 - In vivo Evaluation of Different Serotypes of AAV Vectors

[0106] In this study, 7 recombinant AAV genomes, AAV2CBhAIAT, AAV2AlbhAIAt, AAV2CMVrhCG, AAV2TBGrhCG, AAV2TBGcFIX, AAV2CMVLacZ and AAV2TBGLacZ were packaged with capsid proteins of different serotypes. In all 7 constructs, minigene cassettes were flanked with AAV2 ITRs. cDNAs of human  $\alpha$ -antitrypsin (AIAT) [Xiao, W., et al., (1999) J Virol 73, 3994-4003]  $\beta$ -subunit of rhesus monkey choriogonadotropic hormone (CG) [Zoltick, P. W. & Wilson, J. M. (2000) *Mol Ther* 2, 657-9] canine factor IX [Wang, L., et al., (1997) *Proc Natl Acad Sci USA* 94, 11563-6] and bacterial  $\beta$ -glactosidase (i.e., Lac Z) genes were used as reporter genes. For liver-directed gene transfer, either mouse albumin gene promoter (Alb) [Xiao, W. (1999), cited above] or human thyroid hormone binding globulin gene promoter (TBG) [Wang (1997), cited above] was used to drive liver specific expression of reporter genes. In muscle-directed gene transfer experiments, either cytomegalovirus early promoter (CMV) or chicken  $\beta$ -actin promoter with CMV enhancer (CB) was employed to direct expression of reporters.

[0107] For muscle-directed gene transfer, vectors were injected into the right tibialis anterior of 4-6 week old NCR nude or C57BL/6 mice (Taconic, Germantown, NY). In liver-directed gene transfer studies, vectors were infused intraportally into 7-9 week old NCR nude or C57BL/6 mice (Taconic, Germantown, NY). Serum samples were collected intraorbitally at different time points after vector administration. Muscle and liver tissues were harvested at different time points for cryosectioning and Xgal histochemical staining from animals that received the lacZ vectors. For the re-administration experiment, C56BL/6 mice initially received AAV2/1, 2/2, 2/5, 2/7 and 2/8CBAIAT vectors intramuscularly and followed for A1AT gene expression for 7 weeks. Animals were then treated with AAV2/8TBGcFIX intraportally and studied for cFIX gene expression.

[0108] ELISA based assays were performed to quantify serum levels of hA1AT, rhCG and cFIX proteins as described previously [Gao, G. P., et al., (1996) *J Virol* 70, 8934-43; Zoltick, P. W. & Wilson, J. M. (2000) *Mol Ther* 2, 657-9; Wang, L., et al., *Proc Natl Acad Sci U S A* 94, 11563-6]. The experiments were completed when animals were sacrificed for harvest of muscle and liver tissues for DNA extraction and quantitative analysis of genome copies of vectors present in target tissues by TaqMan using the same set of primers and probe as in titration of vector preparations [Zhang, Y., et al., (2001) *Mol Ther* 3, 697-707].

[0109] The performance of vectors base on the new serotypes were evaluated in murine models of muscle and liver-directed gene transfer and compared to vectors based on the known serotypes AAV1, AAV2 and AAV5. Vectors expressing secreted proteins (alpha-antitrypsin (A1AT) and chorionic gonadotropin (CG)) were used to quantitate relative transduction efficiencies between different serotypes through ELISA analysis of sera. The cellular distribution of transduction within the target organ was evaluated using lacZ expressing vectors and X-gal histochemistry.

[0110] The performance of AAV vectors in skeletal muscle was analyzed following direct injection into the tibialis anterior muscles. Vectors contained the same AAV2 based genome with the immediate early gene of CMV or a CMV enhanced  $\beta$ -actin promoter driving expression of the transgene. Previous studies indicated that immune competent C57BL/6 mice elicit limited humoral responses to the human A1AT protein when expressed from AAV vectors [Xiao, W., et al., (1999) *J Virol* 73, 3994-4003].

[0111] In each strain, AAV2/1 vector produced the highest levels of A I AT and AAV2/2 vector the lowest, with AAV2/7 and AAV2/8 vectors showing intermediate levels of expression. Peak levels of CG at 28 days following injection of nu/nu NCR mice showed the highest levels from AAV2/7 and the lowest from AAV2/2 with AAV2/8 and AAV2/1 in between. Injection of AAV2/1 and AAV2/7 lacZ vectors yielded gene expression at the injection sites in all muscle fibers with substantially fewer lacZ positive fibers observed with AAV2/2 and AAV 2/8 vectors. These data indicate that the efficiency of transduction with AA V2/7 vectors in skeletal muscle is similar to that obtained with AAV2/1, which is the most efficient in skeletal muscle of the previously described serotypes [Xiao, W. (1999), cited above; Chao, H., et al., (2001) *Mol Ther* 4, 217-22; Chao, H., et al., (2000) *Mol Ther* 2, 619-23].

[0112] Similar murine models were used to evaluate liver-directed gene, transfer. Identical doses of vector based on genome copies were infused into the portal veins of mice that were analyzed subsequently for expression of the transgene. Each vector contained an AAV2 based genome using previously described liver-specific promoters (i.e., albumin or thyroid hormone binding globulin) to drive expression of the transgene. More particularly, CMVCG and TBGCG minigene cassettes were used for muscle and liver-directed gene transfer, respectively. Levels of rhCG were defined as relative units (RUs x 10³). The data were from assaying serum samples collected at day 28, post vector administration (4 animals per group). As shown in Table 3, the impact of capsid proteins on the efficiency of transduction of A1AT vectors in nu/nu and C57BL/6 mice and CG vectors in C57BL/6 mice was consistent (See Table 6).

Table 6. Expression of β-unit of Rhesus Monkey Chorionic Gonadotropin (rhCG)

| Vector |        | Muscle         | Liver         |
|--------|--------|----------------|---------------|
|        | AAV2/1 | 4.5 ± 2.1      | 1.6 ± 1.0     |
|        | AAV2   | $0.5 \pm 0.1$  | $0.7 \pm 0.3$ |
|        | AAV2/5 | ND*            | $4.8 \pm 0.8$ |
|        | AAV2/7 | $14.2 \pm 2.4$ | 8.2 ± 4.3     |
|        | AAV2/8 | $4.0 \pm 0.7$  | 76.0 ± 22.    |

<sup>\*</sup> Not determined in this experiment.

35

40

45

[0113] In all cases, AAV2/8 vectors yielded the highest levels of transgene expression that ranged from 16 to 110 greater than what was obtained with AAV2/2 vectors; expression from AAV2/5 and AAV2/7 vectors was intermediate with AAV2/7 higher than AAV2/5. Analysis of X-Gal stained liver sections of animals that received the corresponding lacZ vectors showed a correlation between the number of transduced cells and overall levels of transgene expression. DNAs extracted from livers of C57BL/6 mice who received the A1AT vectors were analyzed for abundance of vector DNA using real time PCR technology.

[0114] The amount of vector DNA found in liver 56 days after injection correlated with the levels of transgene expression (See Table 7). For this experiment, a set of probe and primers targeting the SV40 polyA region of the vector genome was used for TaqMan PCR. Values shown are means of three individual animals with standard deviations. The animals were sacrificed at day 56 to harvest liver tissues for DNA extraction. These studies indicate that AAV8 is the most efficient vector for liver-directed gene transfer due to increased numbers of transduced hepatocytes.

Table 7 - Real Time PCR Analysis for Abundance of AAV Vectors in nu/nu Mouse Liver Following Injection of 1x10<sup>11</sup> Genome Copies of Vector.

| AAV vectors/Dose |               | Genome Copies per Cell |
|------------------|---------------|------------------------|
|                  | AAV2/1AlbA1AT | $0.6 \pm 0.36$         |
|                  | AAV2AlbA1AT   | $0.003 \pm 0.001$      |
|                  | AAV2/5AlbA1AT | $0.83 \pm 0.64$        |
|                  | AAV2/7AlbA1AT | 2.2 ± 1.7              |
|                  | AAV2/8AlbA1AT | 18 ± 11                |

[0115] The serologic data described above suggest that AAV2/8 vector should not be neutralized *in vivo* following immunization with the other serotypes. C57BL/6 mice received intraportal injections of AAV2/8 vector expressing canine factor IX (10<sup>11</sup> genome copies) 56 days after they received intramuscular injections of A1AT vectors of different serotypes. High levels of factor IX expression were obtained 14 days following infusion of AAV2/8 into naïve animals (17 $\pm$ 2  $\mu$ g/ml, n=4) which were not significantly different that what was observed in animals immunized with AAV2/1 (31 $\pm$ 23  $\mu$ g/ml, n=4), AAV2/2 (16  $\mu$ g/ml, n=2), and ÅAV2/7(12  $\mu$ g/ml, n=2). This contrasts to what was observed in AAV2/8 immunized animals that were infused with the AAV2/8 factor IX vector in which no detectable factor IX was observed (< 0.1  $\mu$ g/ml, n=4). [0116] Oligonucleotides to conserved regions of the cap gene did amplify sequences from rhesus monkeys that represented unique AAVs. Identical cap signature sequences were found in multiple tissues from rhesus monkeys derived from at least two different colonies. Full-length rep and cap open reading frames were isolated and sequenced from single sources. Only the cap open reading frames of the novel AAVs were necessary to evaluate their potential as vectors because vectors with the AAV7 or AAV8 capsids were generated using the ITRs and rep from AAV2. This also simplified the comparison of different vectors since the actual vector genome is identical between different vector serotypes. In fact, the yields of recombinant vectors generated using this approach did not differ between serotypes.

[0117] Vectors based on AAV7 and AAV8 appear to be immunologically distinct (i.e., they are not neutralized by antibodies generated against other serotypes). Furthermore, sera from humans do not neutralize transduction by AAV7 and AAV8 vectors, which is a substantial advantage over the human derived AAVs currently under development for which a significant proportion of the human population has pre-existing immunity that is neutralizing [Chirmule, N., et al., (1999) Gene Ther 6, 1574-83].

[0118] The tropism of each new vector is favorable for *in vivo* applications. AAV2/7 vectors appear to transduce skeletal muscle as efficiently as AAV2/1, which is the serotype that confers the highest level of transduction in skeletal muscle of the primate AAVs tested to date [Xiao, W., cited above; Chou (2001), cited above, and Chou (2000), cited above]. Importantly, AAV2/8 provides a substantial advantage over the other serotypes in terms of efficiency of gene transfer to liver that until now has been relatively disappointing in terms of the numbers of hepatocytes stably transduced. AAV2/8 consistently achieved a 10 to 100-fold improvement in gene transfer efficiency as compared to the other vectors. The basis for the improved efficiency of AAV2/8 is unclear, although it presumably is due to uptake via a different receptor that is more active on the basolateral surface of hepatocytes. This improved efficiency will be quite useful in the development of liver-directed gene transfer where the number of transduced cells is critical, such as in urea cycle disorders and familial hypercholesterolemia.

[0119] Thus, the present invention provides a novel approach for isolating new AAVs based on PCR retrieval of genomic sequences. The amplified sequences were easily incorporated into vectors and tested in animals. The lack of pre-existing immunity to AAV7 and the favorable tropism of the vectors for muscle indicates that AAV7 is suitable for use as a vector in human gene therapy and other *in vivo* applications. Similarly, the lack of pre-existing immunity to the AAV serotypes of the invention, and their tropisms, renders them useful in delivery of therapeutic molecules and other useful molecules.

#### Example 9 - Tissue Tropism Studies

5

10

15

30

35

45

50

[0120] In the design of a high throughput functional screening scheme for novel AAV constructs, a non-tissue specific and highly active promoter, CB promoter (CMV enhanced chicken β actin promoter) was selected to drive an easily detectable and quantifiable reporter gene, human α anti-trypsin gene. Thus only one vector for each new AAV clone needs to be made for gene transfer studies targeting 3 different tissues, liver, lung and muscle to screen for tissue tropism of a particular AAV construct. The following table summarizes data generated from 4 novel AAV vectors in the tissue tropism studies (AAVCBA1AT), from which a novel AAV capsid clone, 44.2, was found to be a very potent gene transfer vehicle in all 3 tissues with a big lead in the lung tissue particularly. Table 8 reports data obtained (in μg A1AT/mL serum) at day 14 of the study.

Table 8

| Vector             | Target Tissue |        |         |  |  |  |
|--------------------|---------------|--------|---------|--|--|--|
|                    | Lung          | Liver  | Muscle  |  |  |  |
| AAV2/1             | ND            | ND     | 45±11   |  |  |  |
| AAV2/5             | 0.6±0.2       | ND     | ND      |  |  |  |
| AAV2/8             | ND            | 84±30  | ·ND     |  |  |  |
| AAV2/rh.2 (43.1)   | 14±7          | 25±7.4 | 35±14   |  |  |  |
| AAV2/rh.10 (44.2)  | 23±6          | 53±19  | 46±11   |  |  |  |
| AAV2/rh.13 (42.2)  | 3.5±2         | 2±0.8  | 3.5±1.7 |  |  |  |
| AAV2/rh.21 (42.10) | 3.1±2         | 2±1.4  | 4.3±2   |  |  |  |

A couple of other experiments were then performed to confirm the superior tropism of AAV 44.2 in lung tissue. First, AAV vector carried CC10hA1AT minigene for lung specific expression were pseudotyped with capsids of novel AAVs were given to Immune deficient animals (NCR nude) in equal volume (50  $\mu$ I each of the original preps without dilution) via intratracheal injections as provided in the following table. In Table 9, 50  $\mu$ I of each original prep per mouse, NCR Nude, detection limit  $\geq$ 0.033  $\mu$ g/mI, Day 28

Table 9

|                 |                             | i abie 9                          |                                                 |                                                                   |
|-----------------|-----------------------------|-----------------------------------|-------------------------------------------------|-------------------------------------------------------------------|
| Vector          | Total GC in 50 μl<br>vector | μg of A1AT/ml with<br>50μl vector | μg of A1AT/ml with<br>1x10 <sup>11</sup> vector | Relative Gene<br>transfer as<br>compared to rh.10<br>(clone 44.2) |
| 2/1             | 3x10 <sup>12</sup>          | 2.6±0.5                           | 0.09±0.02                                       | 2.2                                                               |
| 2/2             | 5.5x10 <sup>11</sup>        | <0.03                             | <0.005                                          | <0.1                                                              |
| 2/5             | 3.6x10 <sup>12</sup>        | 0.65±0.16                         | 0.02±0.004                                      | 0.5                                                               |
| 2/7             | 4.2x10 <sup>12</sup>        | 1±0.53                            | 0.02±0.01                                       | 0.5                                                               |
| 2/8             | 7.5x10 <sup>11</sup>        | 0.9±0.7                           | 0.12±0.09                                       | 2.9                                                               |
| 2/ch.5 (A.3.1)  | 9x10 <sup>12</sup>          | 1±0.7                             | 0.01±0.008                                      | 0.24                                                              |
| 2/rh.8 (43.25)  | 4.6x10 <sup>12</sup>        | 26±21                             | 0.56±0.46                                       | 13.7                                                              |
| 2/rh.10 (44.2)  | 2.8x10 <sup>12</sup>        | 115±38                            | 4.1±1.4                                         | 100                                                               |
| 2/rh.13 (42.2)  | 6x10 <sup>12</sup>          | 7.3±0.8                           | 0.12±0.01                                       | 2.9                                                               |
| 2/rh.21 (42.10) | 2.4x10 <sup>12</sup>        | 9±0.9                             | 0.38±0.04                                       | 9.3                                                               |
| 2/rh.22 (42.11) | 2.6x10 <sup>12</sup>        | 6±0.4                             | 0.23±0.02                                       | 5.6                                                               |
| 2/rh.24 (42.13) | 1.1x10 <sup>11</sup>        | 0.4±0.3                           | 0.4±0.3                                         | 1                                                                 |

The vectors were also administered to immune competent animals (C57BL/6) in equal genome copies (1x10<sup>11</sup> GC) as shown in the Table 10. (1x10<sup>11</sup> GC per animal, C57BL/6, day 14, detection limit  $\geq$ 0.033  $\mu$ g/ml)

Table 10

| AAV Vector | μg of A1AT/ml with 1x10 <sup>11</sup> vector | Relative Gene transfer as compared to rh.10 (clone 44.2) |
|------------|----------------------------------------------|----------------------------------------------------------|
| 2/1        | 0.076±0.031                                  | 2.6                                                      |
| 2/2        | 0.1±0.09                                     | 3.4                                                      |
| 2/5        | 0.0840.033                                   | 2.9                                                      |

#### Table continued

| AAV Vector      | μg of A1AT/ml with 1x10 <sup>11</sup> vector | Relative Gene transfer as compared to rh.10 (clone 44.2) |
|-----------------|----------------------------------------------|----------------------------------------------------------|
| 2/7             | 0.33±0.01                                    | 11                                                       |
| 2/8             | 1.92±1.3                                     | 2.9                                                      |
| 2/ch.5 (A.3.1)  | 0.048±0.004                                  | 1.6                                                      |
| 2/rh.8 (43.25)  | 1.7±0.7                                      | 58                                                       |
| 2/rh.10 (44.2)  | 2.93±1.7                                     | 100                                                      |
| 2/m.13 (42.2)   | 0.45±0.15                                    | 15                                                       |
| 2/rh.21 (42.10) | 0.86±0.32                                    | 29                                                       |
| 2/rh.22 (42.11) | 0.38±0.18                                    | 13                                                       |
| 2/rh.24 (42.13) | 0.3±0.19                                     | 10                                                       |

[0121] The data from both experiments confirmed the superb tropism of clone 44.2 in lung-directed gene transfer.

[0122] Interestingly, performance of clone 44.2 in liver and muscle directed gene transfer was also outstanding, close to that of the best liver transducer, AAV8 and the best muscle transducer AAV1, suggesting that this novel AAV has some intriguing biological significance.

[0123] To study serological properties of those novel AAVs, pseudotyped AAVGFP vectors were created for immunization of rabbits and in vitro transduction of 84-31 cells in the presence and absence of antisera against different capsids. The data are summarized below:

Table 11a. Cross-NAB assay in 8431 cells and adenovirus (Adv) coinfection infection in 8431 cells (coinfected with Adv) with:

| Serum from rabbit immunized with: | 10 <sup>9</sup> GC | 10 <sup>9</sup> GC | 10 <sup>9</sup> GC | 10 <sup>10</sup> GC |
|-----------------------------------|--------------------|--------------------|--------------------|---------------------|
|                                   | rh.13              | rh.21              | rh.22              | rh.24               |
|                                   | AAV2/42.2          | AAV2/42.10         | AAV2/42.1          | AAV2/42.13          |
| AAV2/1                            | 1/20               | 1/20               | 1/20               | No NAB              |
| AAV2/2                            | 1/640              | 1/1280             | 1/5120             | No NAB              |
| AAV2/5                            | No NAB             | 1/40               | 1/160              | No NAB              |
| AAV2/7                            | 1/81920            | 1/81920            | 1/40960            | 1/640               |
| AAV2/8                            | 1/640              | 1/640              | 1/320              | 1/5120              |
| <b>Ch.5</b> AAV2/A3               | 1/20               | 1/160              | 1/640              | 1/640               |
| rh.8<br>AAV2/43.25                | 1/20               | 1/20               | 1/20               | 1/320               |
| <i>rh.10</i><br>AAV2/44.2         | No NAB             | No NAB             | No NAB             | 1/5120              |
| <i>rh.13</i><br>AAV2/42.2         | 1/5120             | 1/5120             | 1/5120             | No NAB              |
| <b>rh.21</b><br>AA V2/42.10       | 1/5120             | 1/10240            | 1/5120             | 1/20                |
| <b>rh.22</b><br>AAV2/42.11        | 1/20480            | 1/20480            | 1/40960            | No NAB              |
| <i>rh.24</i><br>AAV2/42.13        | No NAB             | 1/20               | 1/20               | 1/5120              |

Table 11b. Cross-NAB assay in 8431 cells and Adv coinfection Infection in 8431 cells (coinfected with Adv) with:

| Serum from rabbit immunized with: | 10 <sup>9</sup> GC | 10 <sup>10</sup> GC | 10 <sup>10</sup> GC | 10 <sup>9</sup> GC | 10 <sup>9</sup> GC |
|-----------------------------------|--------------------|---------------------|---------------------|--------------------|--------------------|
| •                                 | rh.12              | ch.5                | rh. 8               | rh.10              | rh.20              |
|                                   | AAV2/42.1B         | AAV2/A3             | AAV2/43.25          | AAV2/44.2          | AAV2/42.8.2        |
| AAV2/1                            | No NAB             | 1/20480             | No NAB              | 1/80               | ND                 |
| AAV2/2                            | 1/20               | No NAB              | No NAB              | No NAB             | ND \               |
| AAV2/5                            | No NAB             | 1/320               | No NAB              | No NAB             | ND                 |
| AAV2/7                            | 1/2560             | 1/640               | 1/160               | 1/81920            | ND                 |
| AAV2/8                            | 1/10240            | 1/2560              | 1/2560              | 1/81920            | ND                 |
| ch.5 AAV2/A3                      | 1/1280             | 1/10240             | ND                  | 1/5120             | 1/320              |
| rh.8 AAV2/43.25                   | 1/1280             | ND                  | 1/20400             | 1/5120             | 1/2560             |
| rh.10 AAV2/44.2                   | 1/5120             | ND                  | ND                  | 1/5120             | 1/5120             |
| rh.13 AAV2/42.2                   | 1/20               | ND                  | ND                  | No NAB             | 1/320              |
| rh.21 AAV2/42.10                  | 1/20               | ND                  | ND                  | 1/40               | 1/80               |
| rh.22 AAV2/42.1 1                 | No NAB             | ND                  | ND                  | ND                 | No NAB             |
| rh.24 AAV2/42.13                  | 1/5120             | ND                  | ND                  | ND                 | 1/2560             |

Table 12

|       | Titer of rabbit s | Titer after Boosting |           |
|-------|-------------------|----------------------|-----------|
| ·     | Vector            | Titer d21            |           |
| ch.5  | AAV2/A3           | 1/10,240             | 1/40,960  |
| rh.8  | AAV2/43.25        | 1/20,400             | 1/163,840 |
| rh.10 | AAV2/44.2         | 1/10,240             | 1/527,680 |
| rh.13 | AAV2/42.2         | 1/5,120              | 1/20,960  |
| rh.21 | AAV2/42.10        | 1/20,400             | 1/81,920  |
| rh.22 | AAV2/42.11        | 1/40,960             | ND        |
| rh.24 | AAV2/42.13        | 1/5,120              | ND        |

Table 13 a. Infection in 8431 cells (coinfected with Adv) with GFP

|             | 10 <sup>9</sup> GC/well | 10 <sup>9</sup> GC/weli | 109 GC/well | 10 <sup>9</sup> GC/well | 10 <sup>9</sup> GC/well | 109 GC/well |
|-------------|-------------------------|-------------------------|-------------|-------------------------|-------------------------|-------------|
|             |                         |                         |             |                         |                         | ch.5        |
|             | AAV2/1                  | AAV2/2                  | AAV2/5      | AAV2/7                  | AAV2/8                  | AAV2/A3     |
|             | 128                     | >200                    | 95          | 56                      | 13                      | 1           |
| # GFU/field | 83                      | >200                    | 65          | 54                      | 11                      | 1 1         |
|             |                         |                         |             |                         |                         |             |

|  | _ |
|--|---|
|  | Э |
|  |   |

5

5

|             |             | Table 13b. Infec | Table 13b. Infection in 8431 cells (coinfected with Adv) with GFP                                                                                                                               | ls (coinfected wi | ith Adv) with GF | <u>e</u>    | •           |
|-------------|-------------|------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|------------------|-------------|-------------|
| •           | 109 GC/well | 109 GC/well      | 10 <sup>9</sup> GC/well | 109 GC/well       | 109 GC/well      | 109 GC/well | 109 GC/well |
|             | rh.8        | rh. 10           | rh.13                                                                                                                                                                                           | rh.21             | rh.22            | rh.24       | rh. 12      |
|             | AAV2/43 25  | AAV2/44.2        | AAV2/43 25 AAV2/42.2 AAV2/42.10 AAV2/42.11 AAV2/42.13 AAV2/42.1B                                                                                                                                | AAV2/42.10        | AAV2/42.11       | AAV2/42.13  | AAV2/42.1B  |
|             | 3           | 13               | 54                                                                                                                                                                                              | 62                | 10               | 3           | 18          |
| # GFU/field | 2           | 12 .             | 71                                                                                                                                                                                              | 09                | 14               | 2           | . 20        |
|             |             |                  | 48                                                                                                                                                                                              | 47                | 16               | 3           | 12          |

## Example 10 - Mouse Model of Familial Hypercholesterolemia

[0124] The following experiment demonstrates that the AAV2/7 construct of the invention delivers the LDL receptor and express LDL receptor in an amount sufficient to reduce the levels of plasma cholesterol and triglycerides in animal models of familial hypercholesterolemia.

#### A. Vector Construction

5

20

30

35

45

55

[0125] AAV vectors packaged with AAV7 or AAV8 capsid proteins were constructed using a pseudotyping strategy [Hildinger M, et al., J. Virol 2001; 75:6199-6203]. Recombinant AAV genomes with AAV2 inverted terminal repeats (ITR) were packaged by triple transfection of 293 cells with the *cis*-plasmid, the adenovirus helper plasmid and a chimeric packaging construct, a fusion of the capsids of the novel AAV serotypes with the rep gene of AAV2. The chimeric packaging plasmid was constructed as previously described [Hildinger et al, cited above]. The recombinant vectors were purified by the standard CsCl<sub>2</sub> sedimentation method. To determine the yield TaqMan (Applied Biosystems) analysis was performed using probes and primers targeting the SV40 poly(A) region of the vectors [Gao GP, et al., Hum Gene Ther. 2000 Oct 10;11(15):2079-91]. The resulting vectors express the transgene under the control of the human thyroid hormone binding globulin gene promoter (TBG).

## B. Animals

[0126] LDL receptor deficient mice on the C57Bl/6 background were purchased from the Jackson Laboratory (Bar Harbor, ME, USA) and maintained as a breeding colony. Mice were given unrestricted access to water and obtained a high fat Western Diet (high % cholesterol) starting three weeks prior vector injection. At day -7 as well at day 0, blood was obtained via retroorbital bleeds and the lipid profile evaluated. The mice were randomly divided into seven groups. The vector was injected via an intraportal injection as previously described ([Chen SJ et al., Mol Therapy 2000; 2(3), 256-261]. Briefly, the mice were anaesthetized with ketamine and xylazine. A laparotomy was performed and the portal vein exposed. Using a 30g needle the appropriate dose of vector diluted in 100ul PBS was directly injected into the portal vein. Pressure was applied to the injection site to ensure a stop of the bleeding. The skin wound was closed and draped and the mice carefully monitored for the following day. Weekly bleeds were performed starting at day 14 after liver directed gene transfer to measure blood lipids. Two animals of each group were sacrificed at the time points week

Table 14

mice were sacrificed at week 20 for plaque measurement and determination oftransgene expression.

6 and week 12 after vector injection to examine atherosclerotic plaque size as well as receptor expression. The remaining

|         | Table 14         |                        |    |
|---------|------------------|------------------------|----|
|         | Vector           | dose                   | п  |
| Group 1 | AAV2/7-TBG-hLDLr | 1x 10 <sup>12</sup> gc | 12 |
| Group 2 | AAV2/7-TBG-hLDLr | 3x 10 <sup>11</sup> gc | 12 |
| Group 3 | AAV2/7-TBG-hLDLr | 1x 10 <sup>11</sup> gc | 12 |
| Group 4 | AAV2/8-TBG-hLDLr | 1x 10 <sup>12</sup> gc | 12 |
| Group 5 | AAV2/8-TBG-hLDLr | 3x 10 <sup>11</sup> gc | 12 |
| Group 6 | AAV2/8-TBG-hLDLr | 1x 10 <sup>11</sup> gc | 12 |
| Group 7 | AAV2/7-TBG-LacZ  | 1x 10 <sup>11</sup> gc | 16 |

#### C. Serum lipoprotein and liver function analysis

[0127] Blood samples were obtained from the retroorbital plexus after a 6 hour fasting period. The serum was separated from the plasma by centrifugation. The amount of plasma lipoproteins and liver transaminases in the serum were detected using an automatized clinical chemistry analyzer (ACE, Schiapparelli Biosystems, Alpha Wassermann)

### D. Detection of transgene expression

[0128] LDL receptor expression was evaluated by immuno-fluorescence staining and Western blotting. For Western Blot frozen liver tissue was homogenized with lysis buffer (20 mM Tris, pH7.4, 130mM NaCl, 1% Triton X 100, proteinase inhibitor (complete, EDTA-free, Roche, Mannheim, Germany). Protein concentration was determined using the Micro

BCA Protein Assay Reagent Kit (Pierce, Rockford, IL). 40 μg of protein was resolved on 4- 15% Tris-HCl Ready Gels (Biorad, Hercules, CA) and transferred to a nitrocellulose membrane (Invitrogen,). To generate Anti-hLDL receptor antibodies a rabbit was injected intravenously with an AdhLDLr prep (1x10<sup>13</sup> GC). Four weeks later the rabbit serum was obtained and used for Western Blot. A 1:100 dilution of the serum was used as a primary antibody followed by a HRP-conjugated anti-rabbit IgG and ECL chemiluminescent detection (ECL Western Blot Detection Kit, Amersham, Arlington Heights, IL).

#### E. Immunocytochemistry

10

20

25

30.

40

45

50

[0129] For determination of LDL receptor expression in frozen liver sections immunohistochemistry analyses were performed. 10um cryostat sections were either fixed in acetone for 5 minutes, or unfixed. Blocking was obtained *via a* 1 hour incubation period with 10% of goat serum. Sections were then incubated for one hour with the primary antibody at room temperature. A rabbit polyclonal antibody anti-human LDL (Biomedical Technologies Inc., Stoughton, MA) was used diluted accordingly to the instructions of the manufacturer. The sections were washed with PBS, and incubated with 1:100 diluted fluorescein goat anti-rabbit IgG (Sigma, St Louis, MO). Specimens were finally examined under fluorescence microscope Nikon Microphot-FXA. In all cases, each incubation was followed by extensive washing with PBS. Negative controls consisted of preincubation with PBS, omission of the primary antibody, and substitution of the primary antibody by an isotype-matched non-immune control antibody. The three types of controls mentioned above were performed for each experiment on the same day.

#### F. Gene transfer efficiency

[0130] Liver tissue was obtained after sacrificing the mice at the designated time points. The tissue was shock frozen in liquid nitrogen and stored at -80°C until further processing. DNA was extracted from the liver tissue using a QIAamp DNA Mini Kit (QIAGEN GmbH, Germany) according to the manufacturers protocol. Genome copies of AAV vectors in the liver tissue were evaluated using Taqman analysis using probes and primers against the SV40 poly(A) tail as described above.

#### G. Atherosclerotic plaque measurement

[0131] For the quantification of the atherosclerotic plaques in the mouse aorta the mice were anaesthetized (10% ketamine and xylazine, ip), the chest opened and the arterial system perfused with ice-cold phosphate buffered saline through the left ventricle. The aorta was then carefully harvested, slit down along the ventral midline from the aortic arch down to the femoral arteries and fixed in formalin. The lipid-rich atherosclerotic plaques were stained with Sudan IV (Sigma, Germany) and the aorta pinned out flat on a black wax surface. The image was captured with a Sony DXC-960 MD color video camera. The area of the plaque as well as of the complete aortic surface was determined using Phase 3 Imaging Systems (Media Cybernetics).

#### H. Clearance of I125 LDL

[0132] Two animals per experimental group were tested. A bolus of I<sup>125</sup>-labeled LDL (generously provided by Dan Rader, U Penn) was infused slowly through the tail vein over a period of 30 sec (1,000,000 counts of [I<sup>125</sup>]-LDL diluted in 100 µl sterile PBS/ animal). At time points 3min, 30 min, 1.5hr, 3hr, 6hr after injection a blood sample was obtained via the retro-orbital plexus. The plasma was separated off from the whole blood and 10 µl plasma counted in the gamma counter. Finally the fractional catabolic rate was calculated from the lipoprotein clearance data.

## 1. Evaluation of Liver Lipid accumulation

[0133] Oil Red Staining of frozen liver sections was performed to determine lipid accumulation. The frozen liver sections were briefly rinsed in distilled water followed by a 2 minute incubation in absolute propylene glycol. The sections were then stained in oil red solution (0.5% in propylene glycol) for 16 hours followed by counterstaining with Mayer's hematoxylin solution for 30 seconds and mounting in warmed glycerin jelly solution.

[0134] For quantification of the liver cholesterol and triglyceride content liver sections were homogenized and incubated in chloroform/methanol (2:1) overnight. After adding of 0.05% H<sub>2</sub>SO<sub>4</sub> and centrifugation for 10 minutes, the lower layer of each sample was collected, divided in two aliquots and dried under nitrogen. For the cholesterol measurement the dried lipids of the first aliquot were dissolved in 1% Triton X-100 in chloroform. Once dissolved, the solution was dried under nitrogen. After dissolving the lipids in ddH<sub>2</sub>0 and incubation for 30 minutes at 37°C the total cholesterol concentration was measured using a Total Cholesterol Kit (Wako Diagnostics). For the second aliquot the dried lipids were dissolved

in alcoholic KOH and incubated at 60°C for 30 minutes. Then 1 M MgCl2 was added, followed by incubation on ice for 10 minutes and centrifugation at 14,000 rpm for 30 minutes. The supernatant was finally evaluated for triglycerides (Wako Diagnostics).

[0135] All of the vectors pseudotyped in an AAV2/8 or AAV2/7 capsid lowered total cholesterol, LDL and triglycerides as compared to the control. These test vectors also corrected phenotype of hypercholesterolemia in a dose-dependent manner. A reduction in plaque area for the AAV2/8 and AAV2/7 mice was observed in treated mice at the first test (2 months), and the effect was observed to persist over the length of the experiment (6 months).

Example 10 - Functional Factor IX Expression and Correction of Hemophilia

A. Knock-Out Mice

5

10 .

[0136] Functional canine factor IX (FIX) expression was assessed in hemophilia B mice. Vectors with capsids of AAV1, AAV2, AAV5, AAV7 or AAV8 were constructed to deliver AAV2 5' ITR - liver-specific promoter [LSP] - canine FIX - woodchuck hepatitis post-regulatory element (WPRE) - AAV2 3' ITR. The vectors were constructed as described in Wang et al, 2000, *Molecular Therapy* 2: 154-158), using the appropriate capsids.

[0137] Knock-out mice were generated as described in Wang et al, 1997. *Proc. Natl. Acad. Sci. USA* 94: 11563-11566. This model closely mimic the phenotypes of hemophilia B in human.

[0138] Vectors of different serotypes (AAV1, AAV2, AAV5, AAV7 and AAV8) were delivered as a single intraportal injection into the liver of adult hemophiliac C57Bl/6 mice in a dose of 1x10<sup>11</sup> GC/mouse for the five different serotypes and one group received an AAV8 vector at a lower dose, 1x10<sup>10</sup> GC/mouse. Control group was injected with 1 x 10<sup>11</sup> GC of AAV2/8 TBG LacZ3. Each group contains 5-10 male and female mice. Mice were bled bi-weekly after vector administration.

25 1. ELISA

30

40

[0139] The canine FIX concentration in the mouse plasma was determined by an ELISA assay specific for canine factor IX, performed essentially as described by Axelrod et al, 1990, *Proc.Natl.Acad.Sci. USA, 87:5173-5177* with modifications. Sheep anti-canine factor IX (Enzyme Research Laboratories) was used as primary antibody and rabbit anti-canine factor IX ((Enzyme Research Laboratories) was used as secondary antibody. Beginning at two weeks following injection, increased plasma levels of cFIX were detected for all test vectors. The increased levels were sustained at therapeutic levels throughout the length of the experiment, i.e., to 12 weeks. Therapeutic levels are considered to be 5% of normal levels, i.e., at about 250 ng/mL.

[0140] The highest levels of expression were observed for the AAV2/8 (at 10<sup>11</sup>) and AAV2/7 constructs, with sustained superphysiology levels cFIX levels (ten-fold higher than the normal level). Expression levels for AAV2/8 (10<sup>11</sup>) were approximately 10 fold higher than those observed for AAV2/2 and AAV2/8 (10<sup>10</sup>). The lowest expression levels, although still above the therapeutic range, were observed for AAV2/5.

2. In Vitro Activated Partial Thromboplastin time (aPTT) Assav

[0141] Functional factor IX activity in plasma of the FIX knock-out mice was determined by an *in vitro* activated partial thromboplastin time (aPTT) assay-Mouse blood samples were collected from the retro-orbital plexus into 1/10 volume of citrate buffer. The aPTT assay was performed as described by Wang et al, 1997, *Proc. Natl. Acad. Sci. USA* 94: 11563-11566.

[0142] Clotting times by aPTT on plasma samples of all vector injected mice were within the normal range (approximately 60 sec) when measured at two weeks post-injection, and sustained clotting times in the normal or shorter than normal range throughout the study period (12 weeks).

[0143] Lowest sustained clotting times were observed in the animals receiving AAV2/8 (1011) and AAV2/7. By week 12, AAV2/2 also induced clotting times similar to those for AAV2/8 and AAV2/7. However, this lowered clotting time was not observed for AAV2/2 until week 12, whereas lowered clotting times (in the 25 - 40 sec range) were observed for AAV2/8 and AAV2/7 beginning at week two.

[0144] Immuno-histochemistry staining on the liver tissues harvested from some of the treated mice is currently being performed. About 70-80% of hepatocytes are stained positive for canine FIX in the mouse injected with AAV2/8.cFIX vector.

B. Hemophilia B Dogs

[0145] Dogs that have a point mutation in the catalytic domain of the F.IX gene, which, based on modeling studies.

appears to render the protein unstable, suffer from hemophilia B [Evans et al, 1989, Proc. Natl. Acad. Sci. USA, 86:10095-10099). A colony of such dogs has been maintained for more than two decades at the University of North Carolina, Chapel Hill. The homeostatic parameters of these dogs are well described and include the absence of plasma F.IX antigen, whole blood clotting times in excess of 60 minutes, whereas normal dogs are 6-8 minutes, and prolonged activated partial thromboplastin time of 50-80 seconds, whereas normal dogs are 13-28 seconds. These dogs experience recurrent spontaneous hemorrhages. Typically, significant bleeding episodes are successfully managed by the single intravenous infusion of 10 ml/kg of normal canine plasma; occasionally, repeat infusions are required to control bleeding. [0146] Four dogs are injected intraportally with AAV.cFIX according to the schedule below. A first dog receives a single injection with AAV2/2.cFIX at a dose of 3.7x10<sup>11</sup> genome copies (GC)/kg. A second dog receives a first injection of AAV2/2.cFIX (2.8x10<sup>11</sup> GC/kg), followed by a second injection with AAV2/7.cFIX (2.3x10<sup>13</sup> GC/kg) at day 1180. A third dog receives a single injection with AAV2/2.cFIX at a dose of 4.6x10<sup>12</sup> GC/kg. The fourth dog receives an injection with AAV2/2.cFIX (2.8x10<sup>12</sup> GC/kg) and an injection at day 99.5 with AAV2/7.cFIX (5x10<sup>12</sup> GC/kg).

[0147] The abdomen of hemophilia dogs are aseptically and surgically opened under general anesthesia and a single infusion of vector is administered into the portal vein. The animals are protected from hemorrhage in the peri-operative period by intravenous administration of normal canine plasma. The dog is sedated, intubated to induce general anesthesia, and the abdomen shaved and prepped. After the abdomen is opened, the spleen is moved into the operative field. The splenic vein is located and a suture is loosely placed proximal to a small distal incision in the vein. A needle is rapidly inserted into the vein, then the suture loosened and a 5 F cannula is threaded to an intravenous location near the portal vein threaded to an intravenous location near the portal vein bifurcation. After hemostasis is secured and the catheter balloon inflated, approximately 5.0 ml of vector diluted in PBS is infused into the portal vein over a 5 minute interval. The vector infusion is followed by a 5.0 ml infusion of saline. The balloon is then deflated, the callula removed and venous hemostasis is secured. The spleen is then replaced, bleeding vessels are cauterized and the operative wound is closed. The animal is extubated having tolerated the surgical procedure well. Blood samples are analyzed as described. [Wang et al, 2000, *Molecular Therapy* 2: 154-158]

<sup>25</sup> [0148] Results showing correction or partial correction are anticipated for AAV2/7.

#### SEQUENCE LISTING

#### [0149]

30

35

40

45

55

5

15

20

<110> The Trustees of The University of Pennsylvania

<120> A Method of Detecting and/or Identifying Adeno-Associated Virus (AAV) Sequences and Isolating Novel Sequences Identified Thereby

<130> UPN-02735ff

<150> US 60/350,607

<151> 2001-11-13

<150> US 60/341,117 <151> 2001-12-17

.\_\_.

<150> US 60/377,066 <151> 2002-05-01

<150> US 60/386,675

<151> 2002-06-05

50 <160> 120

<170> PatentIn version 3.1

<210> 1

<211> 4721

<212> DNA

<213> adeno-associated virus serotype 7

## <400> 1

|    | ttggccactc | cctctatgcg | cgctcgctcg | ctcggtgggg | cctgcggacc | aaaggtccgc | 60  |
|----|------------|------------|------------|------------|------------|------------|-----|
| 5  | agacggcaga | gctctgctct | gccggcccca | ccgagcgagc | gagcgcgcat | agagggagtg | 120 |
|    | gccaactcca | tcactagggg | taccgcgaag | cgcctcccac | gctgccgcgt | cagcgctgac | 180 |
|    | gtaaatcacg | tcatagggga | gtggtcctgt | attagctgtc | acgtgagtgc | ttttgcgaca | 240 |
| 10 | ttttgcgaca | ccacgtggcc | atttgaggta | tatatggccg | agtgagcgag | caggatetee | 300 |
|    | attttgaccg | cgaaatttga | acgagcagca | gccatgccgg | gtttctacga | gatcgtgatc | 360 |
|    | aaggtgccga | gcgacctgga | cgagcacctg | ccgggcattt | ctgactcgtt | tgtgaactgg | 420 |
| 15 | gtggccgaga | aggaatggga | gctgcccccg | gattctgaca | tggatctgaa | tctgatcgag | 480 |
|    | caggcacccc | tgaccgtggc | cgagaagctg | cagcgcgact | tcctggtcca | atggcgccgc | 540 |
|    | gtgagtaagg | ccccggaggc | cctgttcttt | gttcagttcg | agaagggcga | gagctacttc | 600 |
| 20 | caccttcacg | ttctggtgga | gaccacgggg | gtcaagtcca | tggtgctagg | ccgcttcctg | 660 |
|    | agtcagattc | gggagaagct | ggtccagacc | atctaccgcg | gggtcgagcc | cacgctgccc | 720 |
| 05 | aactggttcg | cggtgaccaa | gacgcgtaat | ggcgccggcg | gggggaacaa | ggtggtggac | 780 |
| 25 | gagtgctaca | tccccaacta | cctcctgccc | aagacccagc | ccgagctgca | gtgggcgtgg | 840 |
|    | actaacatgg | aggagtatat | aagcgcgtgt | ttgaacctgg | ccgaacgcaa | acggctcgtg | 900 |
|    |            |            |            |            |            |            |     |

|   | gcgcagcacc | tgacccacgt | cagccagacg | caggagcaga | acaaggagaa | tctgaacccc | 960  |
|---|------------|------------|------------|------------|------------|------------|------|
|   | aattcigacg | cgcccgtgat | caggtcaaaa | acctccgcgc | gctacatgga | gctggtcggg | 1020 |
|   | tggctggtgg | accggggcat | cacctccgag | aagcagtgga | tccaggagga | ccaggcctcg | 1080 |
|   | tacatctcct | tcaacgccgc | ctccaactcg | cggtcccaga | tcaaggccgc | gctggacaat | 1140 |
|   | gccggcaaga | tcatggcgct | gaccaaatcc | gcgcccgact | acctggtggg | gccctcgctg | 1200 |
| ) | cccgcggaca | ttaaaaccaa | ccgcatctac | cgcatcctgg | agctgaacgg | gtacgatcct | 1260 |
|   | gcctacgccg | gctccgtctt | tctcggctgg | gcccagaaaa | agttcgggaa | gcgcaacacc | 1320 |
|   | atctggctgt | ttgggcccgc | caccaceggc | aagaccaaca | ttgcggaagc | catcgcccac | 1380 |
| 5 | gccgtgccct | tctacggctg | cgtcaactgg | accaatgaga | actttccctt | caacgattgc | 1440 |
|   | gtcgacaaga | tggtgatctg | gtgggaggag | ggcaagatga | cggccaaggt | cgtggagtcc | 1500 |
|   | gccaaggcca | ttctcggcgg | cagcaaggtg | cgcgtggacc | aaaagtgcaa | gtcgtccgcc | 1560 |
| ) | cagatcgacc | ccacccccgt | gatcgtcacc | tccaacacca | acatgtgcgc | cgtgattgac | 1620 |
|   | gggaacagca | ccaccttcga | gcaccagcag | ccgttgcagg | accggatgtt | caaatttgaa | 1680 |
|   | ctcacccgcc | gtctggagca | cgactttggc | aaggtgacga | agcaggaagt | caaagagttc | 1740 |
| 5 | ttccgctggg | ccagtgatca | cgtgaccgag | gtggcgcatg | agttctacgt | cagaaagggc | 1800 |
|   | ggagccagca | aaagacccgc | ccccgatgac | gcggatataa | gcgagcccaa | gcgggcctgc | 1860 |
|   | ccctcagtcg | cggatccatc | gacgtcagac | gcggaaggag | ctccggtgga | ctttgccgac | 1920 |
| ) | aggtaccaaa | acaaatgttc | tcgtcacgcg | ggcatgattc | agatgctgtt | tccctgcaaa | 1980 |
|   | acgtgcgaga | gaatgaatca | gaatttcaac | atttgcttca | cacacggggt | cagagactgt | 2040 |
|   | ttagagtgtt | tccccggcgt | gtcagaatct | caaccggtcg | tcagaaaaaa | gacgtatcgg | 2100 |
| • | aaactctgcg | cgattcatca | tctgctgggg | cgggcgcccg | agattgcttg | ctcggcctgc | 2160 |
|   | gacctggtca | acgtggacct | ggacgactgc | gtttctgagc | aataaatgac | ttaaaccagg | 2220 |
| • | tatggctgcc | gatggttatc | ttccagattg | gctcgaggac | aacctctctg | agggcattcg | 2280 |
|   | cgagtggtgg | gacctgaaac | ctggagcccc | gaaacccaaa | gccaaccagc | aaaagcagga | 2340 |
|   | caacggccgg | ggtctggtgc | ttcctggcta | caagtacctc | ggaccettca | acggactcga | 2400 |
|   | caagggggag | cccgtcaacg | cggcggacgc | agcggccctc | gagcacgaca | aggcctacga | 2460 |
|   | ccagcagete | aaagcgggtg | acaatccgta | cctgcggtat | aaccacgccg | acgccgagtt | 2520 |
| • | tcaggagcgt | ctgcaagaag | atacgtcatt | tgggggcaac | ctcgggcgag | cagtcttcca | 2580 |
|   | ggccaagaag | cgggttctcg | aacctctcgg | tctggttgag | gaaggcgcta | agacggctcc | 2640 |
|   | tgcaaagaag | agaccggtag | agccgtcacc | tcagcgttcc | cccgactcct | ccacgggcat | 2700 |
|   | cggcaagaaa | ggccagcagc | ccgccagaaa | gagactcaat | ttcggtcaga | ctggcgactc | 2760 |
|   | agagtcagtc | cccgaccctc | aacctctcgg | agaacctcca | gcagcgccct | ctagtgtggg | 2820 |
|   |            |            |            |            |            |            |      |

| atctggtac  | a grggctgca | g gcggtggcg  | accaatggca   | gacaataacg   | aaggtgccga | 2880  |
|------------|-------------|--------------|--------------|--------------|------------|-------|
| cggagtggg  | aatgcctca   | g gaaattggc  | ttgcgattco   | acatggctgg   | gcgacagagt | 2940  |
| cattaccac  | agcacccga   | a cctgggccct | gcccacctac   | aacaaccacc   | tctacaagca | 3000  |
| aatctccagt | gaaactgca   | g gtagtacca  | cgacaacacc   | : tacttcggct | acagcacccc | 3060  |
| ctgggggtat | tttgacttt   | a acagattcca | ctgccactto   | tcaccacgtg   | actggcagcg | 3120  |
| actcatcaac | aacaactgg   | g gattccggcc | : caagaagctg | cggttcaagc   | tcttcaacat | 3180  |
| ccaggtcaag | gaggtcacga  | a cgaatgacgg | cgttacgacc   | atcgctaata   | accttaccag | 3240  |
| cacgattcag | gtattctcgg  | , actcggaata | ccagctgccg   | tacgtcctcg   | gctctgcgca | 3300  |
| ccagggctgc | ctgcctccgt  | : tcccggcgga | cgtcttcatg   | attcctcagt   | acggctacct | 3360  |
| gactctcaac | aatggcagto  | agtctgtggg   | acgttcctcc   | ttctactgcc   | tggagtactt | 3420  |
| cccctctcag | atgctgagaa  | cgggcaacaa   | ctttgagttc   | agctacagct   | tcgaggacgt | 3480  |
| gcctttccac | agcagctacg  | cacacagcca   | gagcctggac   | cggctgatga   | atcccctcat | 3540  |
| cgaccagtac | ttgtactacc  | tggccagaac   | acagagtaac   | ccaggaggca   | cagctggcaa | 3600  |
| tcgggaactg | cagttttacc  | agggcgggcc   | ttcaactatg   | gccgaacaag   | ccaagaattg | 3660  |
| gttacctgga | ccttgcttcc  | ggcaacaaag   | agtctccaaa   | acgctggatc   | aaaacaacaa | 3720  |
| cagcaacttt | gcttggactg  | gtgccaccaa   | atatcacctg   | aacggcagaa   | actcgttggt | 3780  |
| taatcccggc | gtcgccatgg  | caactcacaa   | ggacgacgag   | gaccgctttt   | tcccatccag | 3840  |
| cggagtcctg | atttttggaa  | aaactggagc   | aactaacaaa   | actacattgg   | aaaatgtgtt | 3900  |
| aatgacaaat | gaagaagaaa  | ttcgtcctac   | taatcctgta   | gccacggaag   | aatacgggat | 3960  |
| agtcagcagc | aacttacaag  | cggctaatac   | tgcagcccag   | acacaagttg   | tcaacaacca | 4020  |
| gggagcctta | cctggcatgg  | tctggcagaa   | ccgggacgtg   | tacctgcagg   | gtcccatctg | 4080  |
| ggccaagatt | cctcacacgg  | atggcaactt   | tcacccgtct   | cctttgatgg   | gcggctttgg | 4140  |
| acttaaacat | ccgcctcctc  | agatoctgat   | caagaacact   | cccgttcccg   | ctaatcctcc | 4200  |
| ggaggtgttt | actcctgcca  | agtttgcttc   | gttcatcaca   | cagtacagca   | ccggacaagt | 4260  |
| cagcgtggaa | atcgagtggg  | agctgcagaa   | ggaaaacagc   | aagcgctgga   | acccggagat | 4320  |
| tcagtacacc | tccaactttg  | saaagcagac   | tggtgtggac   | tttgccgttg   | acagccaggg | 4380  |
| tgtttactct | gagcctcgcc  | ctattggcac   | togttacete   | acccgtaatc   | tgtaattgca | 4440  |
| tgttaatcaa | taaaccggtt  | gattcgtttc   | agttgaactt   | tggtctcctg   | tgcttcttat | 4500  |
| cttatcggtt | tccatagcaa  | ctggttacac   | attaactgct   | tgggtgcgct   | tcacgataag | 4560  |
| aacactgacg | tcaccgcggt  | acccctagtg   | atggagttgg   | ccactccctc   | tatgcgcgct | 4620  |
| cgctcgctcg | gtggggcctg  | cggaccaaag   | gtccgcagac   | ggcagagctc   | tgctctgccg | 4680  |
| gccccaccga | gcgagcgagc  | gcgcatagag   | ggagtggcca   | a .,         |            | 47.21 |
|            |             |              |              |              |            |       |

<210> 2 <211> 737

<212> PRT

<213> capsid protein of adeno-associated virus serotpye 7

| 5      | <400> 2    | 2           |            |            |            |            |            |            |            |            |            |            |            |            |            |            |
|--------|------------|-------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
|        | Met<br>1   | Ala         | Ala        | Asp        | Gly<br>5   | Tyr        | Leu        | Pro        | qeA        | Trp<br>10  | Leu        | Glu        | qeA        | Asn        | Leu<br>15  | Se         |
| 10 ' ' | Glu        | Gly         | Ile        | Arg<br>20  | Glu        | Trp        | Trp        | Asp        | Leu<br>25  | Lys        | Pro        | Сĵу        | Ala        | Pro<br>30  | ГУз        | Pro        |
| 15     | Lys        | Ala         | Asn<br>35  | Gln        | Gln        | Lys        | Gln        | <b>Asp</b> | Asn        | Gly        | Arg        | Gly        | Leu<br>45  | Val        | Leu        | Pro        |
|        | Gly        | Tyr<br>50   | Lys        | Tyr        | Leu        | Gly        | Pro<br>55  | Phe        | Asn        | Gly        | Leu        | Asp<br>60  | Lys        | Gly        | Glu        | Pro        |
| 20     | Val<br>65  | Asn         | Ala        | Ala        | Asp        | Ala<br>70  | Ala        | Ala        | Leu        | Glu        | His<br>75  | Asp        | Lys        | Ala        | Tyr        | qeA<br>08  |
| 25     | Gln        | Gln         | Leu        | _          | Ala<br>85  | Gly        | Asp        | neA        | Pro        | Tyr<br>90  | Leu        | Arg        | Tyr        | Asn        | His<br>95  | Ala        |
|        | Asp        | Ala         | Glu        | Phe<br>100 | Gln        | Glu        | Arg        | Leu        | Gln<br>105 | Glu        | Asp        | Thr        | Ser        | Phe<br>110 |            | Gly        |
| 30     | Asn        | Leu         | Gly<br>115 | Arg        | Ala        | Val        | Phe        | Gln<br>120 | Ala        | Lys        | Lys        | Arg        | Val<br>125 | Leu        | Glu        | Pro        |
| 35     | Leu        | Gly<br>130  | Leu        | Val        | Glu        | Glu        | Gly<br>135 | Ala        | Lys        | Thr        | Ala        | Pro<br>140 | Ala        | Lys        | Lys        | Arg        |
|        | Pro<br>145 | Val         | Glu        | Pro        | Ser        | Pro<br>150 | Gln        | Arg        | șer        | Pro        | Asp<br>155 | Ser        | Ser        | Thr        | Gly        | Ile<br>160 |
| 40     | Gly        | Lys         | Lys        | Gly        | Gln<br>165 | Gln        | Pro        | Ala        | Arg        | Lys<br>170 | Arg        | Leu        | Asn        | Phe        | Gly<br>175 | Gln        |
| 45 ·   | Thr        | Gly         | Asp        | Ser<br>180 | Glu        | Ser        | Val        | Pro        | Asp<br>185 | Pro        | Gln        | Pro        | Leu        | Gly<br>190 | Glu        | Pro        |
|        | Pro        | Ala         | Ala<br>195 | Pro        | Ser        | Ser        | Val        | Gly<br>200 | Ser        | Gly        | Thr        | Val        | Ala<br>205 | Ala        |            | Gly        |
| 50     | Gly        | Ala.<br>210 | Pro        | Met        | Ala        | Asp        | Asn<br>215 | Asn        | Glu        | GJA        | Ala        | Asp<br>220 | Gly        | Val        | Gly        | Asn        |
| 55     | Ala<br>225 | Ser         | Gly        | Asn        | Trp        | His<br>230 | Cys        | qzA        | Ser        | Thr        | Trp<br>235 | Leu        | Gly        | Asp        | Arg        | Val<br>240 |

| 5  |   | Ile        | Thz        | The        | Ser        | Thr<br>245   |            | Thr        | Trp        | Ala        | 1 Leu<br>250 |            | Thr        | Туг        | Asn        | <b>Asn 2</b> 55 | His        |
|----|---|------------|------------|------------|------------|--------------|------------|------------|------------|------------|--------------|------------|------------|------------|------------|-----------------|------------|
| -  |   | Leu        | Туг        | Lys        | Gln<br>260 |              | Ser        | Ser        | Glu        | Thr<br>265 |              | Gly        | Ser        | Thr        | Asn<br>270 |                 | asA        |
| 10 |   | Thr        | Tyr        | Phe<br>275 |            | Tyr          | Ser        | Thr        | Pro<br>280 |            | Gly          | Tyr        | Phe        | Asp<br>285 |            | Asn             | Arg        |
| 15 |   | Phe        | His<br>290 |            | His        | Phe          | Ser        | Pro<br>295 |            | qeA        | Trp          | Gln        | A≍g<br>300 |            | Ile        | Asn             | Asn        |
|    |   | Asn<br>305 | Trp        | Gly        | Phe        | Arg          | Pro<br>310 | Lys        | Lys        | Leu        | Arg          | Phe<br>315 | Lys        | Leu        | Phe        | Asn             | 11e<br>320 |
| 20 |   | Gln        | Val        | Lys        | Glu        | Val<br>325   | Thr        | Thr        | Asn        | qeA        | Gly<br>330   | Val        | Thr        | Thr        | Ile        | Ala<br>335      | Asn        |
| 25 |   |            |            |            | Ser<br>340 |              |            |            |            | 345        |              |            |            | •          | 350        |                 |            |
|    | · |            |            | 355        | Leu        |              |            |            | 360        |            |              |            |            | 365        |            |                 |            |
| 30 |   |            | 370        |            | Phe        |              |            | 375        |            |            |              |            | 380        |            |            |                 |            |
| 35 |   | 385        |            |            | Ser        |              | 390        |            |            |            |              | 395        |            |            |            |                 | 400        |
|    |   |            |            |            | Met        | 405          |            |            |            |            | 410          |            |            |            |            | 415             |            |
| 40 |   |            |            |            | Val<br>420 |              |            |            |            | 425        |              |            |            |            | 430        |                 |            |
| 45 |   |            |            | 435        | Met        |              |            | į          | 440        |            | •            |            |            | 445        |            |                 |            |
|    |   | Arg        | 450        |            |            |              |            | 455        |            |            |              |            | 460        |            |            |                 |            |
| 50 |   | Phe<br>465 |            |            |            |              | 470        |            |            |            |              | 475        |            |            |            |                 | 480        |
| 55 |   | Leu        | Pro        | Gly        | Pro        | Cys :<br>485 | Phe        | Arg        | Gln        | Gln        | Arg '<br>490 | Val        | Ser        | Lys        |            | Leu .<br>495    | Asp        |

| 5  |     | Glr        | a Asn      | Asr        | 500        |            | . Asn      | Phe        | : Ala      | 7rp<br>505 |            | Gl)        | Ala        | Thr          | 510        | Tyr        | His        |
|----|-----|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|--------------|------------|------------|------------|
|    |     | Let        | ı Asn      | 61y<br>515 |            | Asn        | Ser        | Leu        | Val<br>520 |            | Pro        | Gly        | Va]        | 1 Ala<br>525 |            | : Ala      | Thr        |
| 10 | . , | His        | Lys<br>530 |            | qeA o      | Glu        | dsY        | Arg<br>535 |            | Phe        | Pro        | Ser        | 540        |              | Val        | . Leu      | Ile        |
| 15 |     | Phe<br>545 |            | Lys        | Thr        | Gly        | Ala<br>550 |            | Asn        | Lys        | Thr        | Thr<br>555 |            | Glu          | Asn        | Val        | Leu<br>560 |
|    |     | Met        | Thr        | neA        | Glu        | Glu<br>565 |            | Ile        | Arg        | Pro        | Thr<br>570 | Asn        | Pro        | Val          | Ala        | Thr<br>575 | Glu        |
| 20 |     | Glu        | Tyr        | Gly        | Ile<br>580 | Val        | Ser        | ser        | Asn        | Leu<br>585 | Gln        | Ala        | Ala        | Asn          | Thr<br>590 | Ala        | Ala        |
| 25 | •   | Gln        | Thr        | Gln<br>595 | Val        | Val        | aeA        | Asn        | Gln<br>600 | Gly        | Ala        | Leu        | Pro        | Gly<br>605   | Met        | Val        | Trp        |
|    |     | Gln        | Asn<br>610 | Arg        | Asp        | Val        | Tyr        | Leu<br>615 | Gln        | Gly        | Pro        | Ile        | Trp<br>620 | Ala          | Lys        | Ile        | Pro        |
| 30 |     | His<br>625 | Thr        | Asp        | Gly        | Asn        | Phe<br>630 | His        | Pro        | Ser        | Pro        | Leu<br>635 | Met        | Gly          | Gly        | Phe        | Gly<br>640 |
| 35 |     | Leu        | Lys        | His        | Pro        | Pro<br>645 | Pro        | Gln        | Ile        | Leu        | Ile<br>650 | Lуз        | Asn        | Thr          | Pro        | Val<br>655 | Pro        |
|    |     | Ala        | Asn        | Pro        | Pro<br>660 | Glu        | Val        | Phe        | Thr        | Pro<br>665 | Ala        | ГХЗ        | Phe        | Ala          | Ser<br>670 | Phe        | Ile        |
| 40 |     | Thr        | Gln .      | Tyr<br>675 | Ser        | Thr        | Gly        | Gln        | Val<br>680 | Ser        | Val        | Glu        | Ile        | Glu<br>685   | Trp        | Glu        | Leu        |
| 45 |     | Gln        | Lys<br>690 | Glu        | Asn        | Ser        | Lys        | Arg<br>695 | Trp        | Asn        | Pro        | Glu        | Ile<br>700 | Gln          | Tyr        | Thr        | Ser        |
|    |     | Asn<br>705 | Phe        | Glu        | Lys        | Gln        | Thr<br>710 | Gly        | Val        | qeA        | Phe        | Ala<br>715 | Val        | qeA          | Ser        | Gln        | Gly<br>720 |
| 50 |     | Val        | Tyr        | Ser        | Glu        | Pro<br>725 | Arg        | Pro        | Ile        |            | Thr<br>730 | Arg        | Tyr        | Leu          | Thr        | Arg<br>735 | Asn        |
| 55 |     | Leu        |            |            |            |            |            |            |            |            |            |            |            |              |            |            |            |

<210> 3

<211> 623 <212> PRT

<213> rep protein of adeno-associated virus serotype 7

| 5  | <400> 3 | 3            |           |                   |            |            |            |           |            |            |            |            |           |            |            |            |            |
|----|---------|--------------|-----------|-------------------|------------|------------|------------|-----------|------------|------------|------------|------------|-----------|------------|------------|------------|------------|
|    |         | Met<br>1     | Pro       | Gly               | Phe        | Tyr<br>5   | Glu        | Ile       | · Val      | . Ile      | Lys<br>10  | Val        | Pro       | Ser        | qeA :      | Leu<br>15  | Asp        |
| 10 |         | Glu          | His       | Leu               | Pro<br>20  | Gly        | Ile        | Ser       | Asp        | Ser<br>25  | Phe        | Val        | Asn       | Trp        | Val<br>30  | Ala        | Glu        |
| 15 |         | Lys          | Glu       | Trp<br>35         | Ğlu        | Leu        | Pro        | Pro       | Asp<br>40  | Ser        | Asp        | Met        | Asp       | Leu<br>45  | Asn        | Leu        | Ile        |
| 20 |         | Glu          | Gln<br>50 | Ala               | Pro        | Leu        | Thr        | Val<br>55 | Ala        | Glu        | Lys        | Leu        | Gln<br>60 | Arg        | Asp        | Phe        | Leu        |
|    |         | Val<br>65    | Gln       | Trp               | Arg        | Arg        | Val<br>70  | Ser       | Lys        | Ala        | Pro        | Glu<br>75  | Ala       | Leu        | Phe        | Phe        | Val<br>80  |
| 25 |         | Gln          | Phe       | Glu               | Lys        | Gly<br>85  | Glu        | Ser       | Tyr        | Phe        | His<br>90  | Leu        | His       | Val        | Leu        | Val<br>95  | Glu        |
| 30 |         | Thr          | Thr       | Gly               | Val<br>100 | Lys        | Ser        | Met       | Val        | Leu<br>105 | Gly        | Arg        | Phe       | Leu        | Ser<br>110 | Gln        | Ile        |
|    |         | Arg          | Glu       | <b>Lys</b><br>115 | Leu        | Val        | Gln        |           | Ile<br>120 | Tyr        | Arg        | Gly        | Val       | Glu<br>125 | Pro        | Thr        | Leu        |
| 35 |         |              | 130       |                   |            |            |            | 135       |            |            |            |            | 140       |            | Gly        |            |            |
| 40 |         | 145          |           |                   |            |            | 150        |           |            |            |            | 155        |           |            | Leu        |            | 160        |
|    |         | Thr          | Gln       | Pro               | Glu        | Leu<br>165 | Gln        | Trp       | Ala        | Trp        | Thr<br>170 | Asn        | Met       | Glu        | Glu        | Туг<br>175 | Ile        |
| 45 |         |              |           |                   | 180        |            |            |           |            | 185        |            |            |           |            | Ala<br>190 |            |            |
| 50 |         |              |           | 195               |            |            |            |           | 200        |            |            |            |           | 205        | Asn        |            |            |
|    |         | ;            | 210       |                   |            |            |            | 215       |            |            |            |            | 220       |            | Ala        |            |            |
| 55 |         | Met  <br>225 | Glu       | Leu               | Val        | Gly        | Trp<br>230 | Leu       | Val        | Asp        |            | Gly<br>235 | Ile       | Thr        | Ser        | Glu        | Lys<br>240 |

|    | Gln        | Trp        | Ile        | Gln              | Glu<br>245 | Asp        | Gln        | Ala        | Ser        | Tyr<br>250 |            | Ser        | Phe        | e Asn      | Ala<br>255   |            |
|----|------------|------------|------------|------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|--------------|------------|
| 5  | Ser        | Asn        | Ser        | Arg<br>260       |            | Gln        | Ile        | Lys        | Ala<br>265 |            | Leu        | Asp        | Asn        | Ala<br>270 |              | Lys        |
| 10 | Ile        | Met        | Ala<br>275 |                  | Thr        | Lys        | Ser        | Ala<br>280 |            | Asp        | Tyr        | Leu        | Val<br>285 | вŢУ        | Pro          | Ser        |
|    | Leu        | Pro<br>290 |            | Asp              | Ile        | Lys        | Thr<br>295 | Asn        | Arg        | Ile        | Tyr        | Arg<br>300 |            | Leu        | Glu          | Leu        |
| 15 | aeA<br>205 |            | Tyr        | Asp              | Pro        | Ala<br>310 | Tyr        | Ala        | Gly        | Ser        | Val<br>315 |            | Leu        | Gly        | Trp          | Ala<br>320 |
| 20 | Gln        | Lys        | Lys        | Phe              | Gly<br>325 | Lys        | Arg        | asA        | Thr        | Ile<br>330 |            | Leu        | Phe        | Gly        | Pro<br>335   | Ala        |
| 25 | Thr        | Thr        | Gly        | Lys<br>340       | Thr        | Asn        | Ile        | Ala        | Glu<br>345 | Ala        | Ile        | Ala        | His        | Ala<br>350 | Val          | Pro        |
| 25 | Phe        | Tyr        | Gly<br>355 | Cys              | Val        | Asn        | Trp        | Thr<br>360 | Asn        | Glu        | Asn        | Phe        | Pro<br>365 | Phe        | Asn          | qeA        |
| 30 | Cys        | Val<br>370 | Ąsp        | Lys              | Met        | Val        | Ile<br>375 | Trp        | Trp        | Glu        | Glu        | 380<br>Gly | Lys        | Met        | Thr          | Ala        |
| 35 | Lys<br>385 | Val        | Val        | Glu <sup>.</sup> | Ser        | Ala<br>390 | Lys        | Ala        | Ile        | Leu        | Gly<br>395 | вĵЯ        | Ser        | Lys        | Val          | Arg<br>400 |
|    | Val        | Asp        | Gln        | Lys              | Cys<br>405 | Lys        | Ser        | Ser        | Ala        | Gln<br>410 | Ile        | Asp        | Pro        | Thr        | Pro<br>415   | Val        |
| 40 | Ile        | Val        | Thr        | Ser<br>420       | Asn        | Thr        | Asn        | Met        | Cys<br>425 | Ala        | Val        | Ile        | qeA        | Gly<br>430 | Asn          | Ser        |
| 45 | Thr        | Thr        | Phe<br>435 | Glu              | His        | Gln        | Gln        | Pro<br>440 | Leu        | Gln        | Ążp        | Arg        | Met<br>445 | Phe        | Lys          | Phe        |
|    | Glu        | Leu<br>450 | Thr        | Arg              | Arg        | Leu        | Glu<br>455 | His        | Asp        | Phe        | Gly        | Lys<br>460 | Val        | Thr        | Lys          | Gln        |
| 50 | Glu<br>465 | Val        | Lys        | Glu              | Phe        | Phe<br>470 | Arg        | Trp        | Ala        | Ser        | Asp<br>475 | His        | Val        | Thr        |              | Val<br>480 |
|    | Ala        | His        | Glu        | Phe              | Tyr<br>485 | Val        | Arg        | Lys        | Gly        | Gly<br>490 | Ala        | Ser        | Lys        | Arg        | Pro .<br>495 | Ala        |

|    |       | Pro        | qeA        | qeA        | Ala<br>500 | Asp        | Ile        | Ser        | Glu        | Pro<br>505 | Lys        | Arg        | Ala        | Суз        | Pro<br>510 | Ser        | Val        |
|----|-------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| 5  |       |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |
|    |       | Ala        | Asp        | Pro<br>515 |            | Thr        | Ser        | Asp        | Ala<br>520 | Glu        | Gly        | Ala        | Pro        | Val<br>525 | Ąsp        | Phe        | Ala        |
| 10 |       | qeA        | Arg<br>530 | Tyr        | Gln        | Asn        | Lys        | Cys<br>535 | Ser        | Arg        | His        | Ala        | Gly<br>540 | Met        | Ile        | Gln        | Met        |
| 15 |       | Leu<br>545 | Phe        | Pro        | Cys        | Lys        | Thr<br>550 | Суз        | Glu        | Arg        | Met        | Asn<br>555 | Ğln        | Asn        | Phe        | Asn        | Ile<br>560 |
| 15 |       | Суз        | Phe        | Thr        | His        | Gly<br>565 | Val        | Arg        | Ąsp        | Суз        | Leu<br>570 | Glu        | Суз        | Phe        | Pro        | Gly<br>575 | Val        |
| 20 |       | Ser        | Glu        | Ser        | Gln<br>580 | Pro        | Val        | Val        | Arg        | Lys<br>585 | Lys        | Thr        | Tyr        | Arg        | Lys<br>590 | Leu        | Суз        |
|    |       | Ala        | Ile        | His<br>595 | His        | Leu        | Leu        | Gly        | Arg<br>600 | Ala        | Pro        | Glu        | Ile        | Ala<br>605 | Cys        | Ser        | Ala        |
| 25 |       | Суз        | Asp<br>610 | Leu        | Val        | Asn        | Val        | Asp<br>615 | Leu        | Asp        | qeA        | Cys        | Val<br>620 | Ser        | Glu        | Gln        |            |
| 30 | <210> | 4          |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |
|    | <211> |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |
|    | <212> |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |
|    | <213> | adeno-a    | ssoci      | ated v     | irus se    | erotyp     | e 8        |            |            |            |            |            |            |            |            |            |            |
| 35 | <400> | 4          |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |
|    |       |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |

| cagagagga  | gtggccaact | ccatcactag | gggtagcgcg | aagcgcctcc | cacgctgccg | 60   |
|------------|------------|------------|------------|------------|------------|------|
| cgtcagcgct | gacgtaaatt | acgtcatagg | ggagtggtcc | tgtattagct | gtcacgtgag | 120  |
| tgcttttgcg | gcattttgcg | acaccacgtg | gccatttgag | gtatatatgg | ccgagtgagc | 180  |
| gagcaggatc | tccattttga | ccgcgaaatt | tgaacgagca | gcagccatgc | cgggcttcta | 240  |
| cgagatcgtg | atcaaggtgc | cgagcgacct | ggacgagcac | ctgccgggca | tttctgactc | 300  |
| gtttgtgaac | tgggtggccg | agaaggaatg | ggagctgccc | ccggattctg | acatggatcg | 360  |
| gaatctgatc | gagcaggcac | ccctgaccgt | ggccgagaag | ctgcagcgcg | acttcctggt | 420  |
| ccaatggcgc | cgcgtgagta | aggccccgga | ggccctcttc | tttgttcagt | tcgagaaggg | 480  |
| cgagagctac | tttcacctgc | acgttctggt | cgagaccacg | ggggtcaagt | ccatggtgct | 54 0 |
| aggccgcttc | ctgagtcaga | ttcgggaaaa | gcttggtcca | gaccatctac | ccgcggggtc | 60 0 |
| gagccccacc | ttgcccaact | ggttcgcggt | gaccaaagac | gcggtaatgg | cgccggcggg | 660  |
| ggggaacaag | gtggtggacg | agtgctacat | ccccaactac | ctcctgccca | agactcagcc | 720  |
| cgagctgcag | tgggcgtgga | ctaacatgga | ggagtatata | agegegtget | tgaacctggc | 780  |

|     | cgagcgcaaa   | cggctcgtgg  | cgcagcacct  | gacccacgt  | c agccagacg | c aggagcagaa | 840   |
|-----|--------------|-------------|-------------|------------|-------------|--------------|-------|
| 5   | caaggagaat   | ctgaacccca  | attctgacgo  | gcccgtgat  | c aggtcaaaa | a cctccgcgcg | 900   |
| · · | ctatatggag   | ctggtcgggt  | ggctggtgga  | ccggggcat  | c acctccgag | a agcagtggat | 960   |
|     | ccaggaggac   | caggcctcgt  | acatotoott  | caacgccgc  | c tocaactog | c ggtcccagat | 1020  |
| 10  | caaggccgcg   | ctggacaatg  | ccggcaagat  | catggcgct  | g accaaatcc | g cgcccgacta | 10.80 |
|     | cctggtgggg   | ccctcgctgc  | ccgcggacat  | tacccagaad | cgcatctac   | c gcatcctcgc | 1140  |
|     | tctcaacggc   | tacgaccctg  | cctacgccgg  | ctccgtctt  | t ctcggctgg | g ctcagaaaaa | 1200  |
| 15  | gttcgggaaa   | cgcaacacca  | tctggctgtt  | tggacccgcc | accaccggca  | a agaccaacat | 1260  |
|     | tgcggaagcc   | atogoccacg  | ccgtgccctt  | ctacggctgc | gtcaactgga  | ccaatgagaa   | 1320. |
|     | ctttcccttc   | aatgattgcg  | tcgacaagat  | ggtgatctgg | tgggaggagg  | gcaagatgac   | 1380  |
| 20  | ggccaaggtc   | gtggagtccg  | ccaaggccat  | totoggoggo | agcaaggtgc  | gcgtggacca   | 1440  |
|     | aaagtgcaag   | tegteegeee  | agatcgaccc  | caccccgtg  | atogtoacct  | ccaacaccaa   | 1500  |
|     | catgtgcgcc   | gtgattgacg  | ggaacagcac  | caccttcgag | caccagcagc  | ctctccagga   | 1560  |
| 25  | ccggatgttt   | aagttcgaac  | tcacccgccg  | tctggagcac | gactttggca  | aggtgacaaa   | 1620  |
|     | gcaggaagtc   | aaagagttct  | tccgctgggc  | cagtgatcac | gtgaccgagg  | tggcgcatga   | 1680  |
|     | gttttacgtc   | agaaagggcg  | gagccagcaa  | aagacccgcc | cccgatgacg  | cggataaaag   | 1740  |
| 30  | cgagcccaag ( |             |             |            |             |              | 1800  |
|     | tccggtggac   | tttgccgaca  | ggtaccaaaa  | caaatgttct | cgtcacgcgg  | gcatgcttca   | 1860  |
|     | gatgctgttt ( |             |             |            |             |              | 1920  |
| 35  | acacggggtc a |             |             |            |             |              | 1980  |
|     | cagaaagagg a |             |             |            |             |              | 2040  |
|     | gattgcttgc t |             |             |            |             |              | 2100  |
| 40  | ataaatgact t |             |             |            |             |              | 2160  |
|     | acctctctga g |             |             |            | •           |              | 2220  |
|     | ccaaccagca a |             |             |            |             |              | 2280  |
| 45  | gaccetteaa e |             |             |            |             |              | 2340  |
|     | agcacgacaa g |             |             |            |             | •            | 2400  |
|     | accacgccga c |             | •           |            |             |              | 2460  |
| 50  | tcgggcgagc a |             |             |            | •           | • •          | 2520  |
|     | aaggcgctaa g |             |             |            |             |              | 2580  |
|     | cagactcctc t |             |             |            |             |              | 2640  |
| 55  | ttggtcagac t | ggcgactca g | agtcagttc c | agaccetca  | acctctcgga  | gaacctccag   | 2700  |

|     | cagegeeete | tggtgtggga | cctaatacaa | tggctgcagg | cggtggcgca | ccaatggcag | 2760 |
|-----|------------|------------|------------|------------|------------|------------|------|
|     | acaataacga | aggcgccgac | ggagtgggta | gttcctcggg | aaattggcat | tgcgattcca | 2820 |
|     | catggctggg | cgacagagtc | atcaccacca | gcacccgaac | ctgggccctg | cccacctaca | 2880 |
|     | acaaccacct | ctacaagcaa | atctccaacg | ggacatcggg | aggagccacc | aacgacaaca | 2940 |
|     | cctacttcgg | ctacagcacc | ccctgggggt | attttgactt | taacagattc | cactgccact | 3000 |
| `   | tttcaccacg | tgactggcag | cgactcatca | acaacaactg | gggattccgg | cccaagagac | 3060 |
|     | tcagcttcaa | gctcttcaac | atccaggtca | aggaggtcac | gcagaatgaa | ggcaccaaga | 3120 |
|     | ccatcgccaa | taacctcacc | agcaccatcc | aggtgtttac | ggactcggag | taccagctgc | 3180 |
|     | cgtacgttct | cggctctgcc | caccagggct | gcctgcctcc | gttcccggcg | gacgtgttca | 3240 |
|     | tgattcccca | gtacggctac | ctaacactca | acaacggtag | tcaggccgtg | ggacgctcct | 3300 |
|     | ccttctactg | cctggaatac | tttccttcgc | agatgctgag | aaccggcaac | aacttccagt | 3360 |
|     | ttacttacac | cttcgaggac | gtgcctttcc | acagcagcta | cgcccacagc | cagagettgg | 3420 |
|     | accggctgat | gaatcctctg | attgaccagt | acctgtacta | cttgtctcgg | actcaaacaa | 3480 |
|     | caggaggcac | ggcaaatacg | cagactctgg | gcttcagcca | aggtgggcct | aatacaatgg | 3540 |
|     | ccaatcaggc | aaagaactgg | ctgccaggac | cctgttaccg | ccaacaacgc | gtctcaacga | 3600 |
|     | caaccgggca | aaacaacaat | agcaactttg | cctggactgc | tgggaccaaa | taccatctga | 3660 |
|     | atggaagaaa | ttcattggct | aatcctggca | tcgctatggc | aacacacaaa | gacgacgagg | 3720 |
|     | agcgtttttt | tcccagtaac | gggatcctga | tttttggcaa | acaaaatgct | gccagagaca | 3780 |
|     | atgcggatta | cagcgatgtc | atgctcacca | gcgaggaaga | aatcaaaacc | actaaccctg | 3840 |
|     | tggctacaga | ggaatacggt | atcgtggcag | ataacttgca | gcagcaaaac | acggctcctc | 3900 |
|     | aaattggaac | tgtcaacagc | cagggggcct | tacccggtat | ggtctggcag | aaccgggacg | 3960 |
|     | tgtacctgca | gggtcccatc | tgggccaaga | ttcctcacac | ggacggcaac | ttccacccgt | 4020 |
|     | ctccgctgat | gggeggettt | ggcctgaaac | atcctccgcc | tcagatcctg | atcaagaaca | 4080 |
|     | cgcctgtacc | tgcggatcct | ccgaccacct | tcaaccagtc | aaagctgaac | tctttcatca | 4140 |
| : . | cgcaatacag | caccggacag | gtcagcgtgg | amattgamtg | ggagctgcag | aaggaaaaca | 4200 |
|     | gcaagcgctg | gaaccccgag | atccagtaca | cctccaacta | ctacaaatct | acaagtgtgg | 4260 |
|     | actttgctgt | taatacagaa | ggcgtgtact | ctgaaccccg | cccattggc  | accegttace | 4320 |
|     | tcacccgtaa | tctgtaattg | cctgttaatc | aataaaccgg | ttgattcgtt | tcagttgaac | 4380 |
|     | trtggtctct | gcg        |            |            |            | ·          | 4393 |

<210> 5

<211> 4385

<212> DNA

<213> adeno-associated virus serotype 9

<400> 5

|    | cagagaggga   | gtggccaact   | ccatcacta  | g gggtaatcg | c gaagegeet | c ccacgetgee | 60    |
|----|--------------|--------------|------------|-------------|-------------|--------------|-------|
|    | gcgtcagcgc   | tgacgtagat   | tacgtcatag | g gggagtggt | ctgtattage  | tgtcacgtga   | 120   |
| 5  | gtgcttttgc   | gacattttgc   | gacaccacat | ggccatttg   | a ggtatatat | g gccgagtgag | 180   |
|    | cgagcaggat   | ctccattttg   | accgcgaaat | ttgaacgag   | agcagccato  | ccgggcttct   | 240   |
|    | acgagattgţ   | gatcaaggtg   | ccgagcgac  | tggacgagc   | cetgeeggg   | atttctgact   | 300   |
| 10 | cttttgtgaa   | ctgggtggcc   | gagaaggaat | gggagctgc   | cccggattct  | gacatggate   | 360   |
|    | ggaatctgat   | cgagcaggca   | cccctgaccg | tggccgagaa  | gctgcagcgc  | gacttoctgg   | 420   |
|    | tccaatggcg   | ccgcgtgagt   | aaggccccgg | aggccctctt  | ctttgttcag  | ttcgagaagg   | 480   |
| 15 | gcgagagcta   | ctttcacctg   | cacgttctgg | tcgagaccac  | gggggtcaag  | tccatggtgc   | 540   |
|    | taggccgctt   | cctgagtcag   | attcgggaga | agctggtcca  | gaccatctac  | cgcgggatcg   | 600   |
|    | agccgaccct   | gcccaactgg   | ttcgcggtga | ccaagacgcg  | taatggcgcc  | gacdd dddda  | 660   |
| 20 | acaaggtggt   | ggacgagtgc   | tacatcccca | actacctcct  | gcccaagact  | cagcccgagc   | 720   |
|    | tgcagtgggc   | gtggactaac   | atggaggagt | atataagcgc  | gtgcttgaac  | ctggccgagc   | 780   |
| 25 | gcaaacggct   | cgtggcgcag   | cacctgaccc | acgtcagcca  | gacgcaggag  | cagaacaagg   | 84.0  |
| 25 | agaatctgaa   | ccccaattct   | gacgcgcccg | tgatcaggtc  | &aaaascctcc | gcgcgctaca   | 900   |
|    | tggagctggt   | cgggtggctg   | gtggaccggg | gcatcacctc  | cgagaagcag  | tggatccagg   | 960   |
| 30 | aggaccaggc   | ctcgtacatc   | tccttcaacg | ccgcctccaa  | ctcgcggtcc  | cagatcaagg   | 1020  |
| 00 | ccgcgctgga   | caatgccggc   | aagatcatgg | cgctgaccaa  | atccgcgccc  | gactacctgg   | 1080  |
|    | taggcccttc   | acttccggtg   | gacattacgc | agaaccgcat  | ctaccgcatc  | ctgcagctca   | 1140  |
| 35 | •            |              |            |             | ctgggcacaa  |              | 1200  |
|    |              |              |            |             | gggaaagacc  | •            | 1260  |
|    |              |              |            |             | ctggaccaat  |              | 1320  |
| 40 | ccttcaacga   |              |            |             |             |              | 1380  |
|    | aggtcgtgga   | gtccgccaag   | gccattctcg | gcggcagcaa  | ggtgcgcgtg  | gaccaaaagt   | 1440  |
|    | gcaagtcgtc   |              |            |             |             |              | 1500  |
| 45 | gcgccgtgat   |              |            |             |             |              | 1560  |
|    | tgtttaagtt   |              |            |             |             |              | 1620  |
|    | aagtcaaaga   |              |            | •           |             |              | 1680  |
| 50 | acgtcagaaa   | gggcggagcc . | agcaaaagac | ccgcccccga  | tgacgcggat  | aaaagcgagc   | 1740  |
|    | ccaagcgggc   | ctgcccctca   | gtcgcggatc | catcgacgtc  | agacgcggaa  | ggagctccgg   | 1800  |
|    | tggactttgc   | cgacaggtac   | caaaacaaat | gttctcgtca  | cgcgggcatg  | cttcagatgc   | 1860. |
| 55 | tgcttccctg ( | caaaacgtgc ( | gagagaatga | atcagaattt  | caacatttgc  | ttcacacacg   | 1920  |
|    |              |              |            |             |             |              |       |

|                | gggtcagag  | a ctgctcagag | tgtttccccg | gcgtgtcaga | atctcaaccg | gtcgtcagaa | 1980  |
|----------------|------------|--------------|------------|------------|------------|------------|-------|
|                | agaggacgt  | a toggaaacto | tgtgcgattc | atcatctgct | ggggcgggct | cccgagattg | 2040  |
| 5              | cttgctcgg  | c ctgcgatctg | gtcaacgtgg | acctggatga | ctgtgtttct | gagcaataaa | 2100  |
|                | tgacttaaa  | c caggtatggc | tgccgatggt | tatcttccag | attggctcga | ggacaacctc | 2160  |
|                | tctgagggc  | a ttcgcgagtg | gtgggcgctg | aaacctggag | ccccgaagcc | caaagccaac | 2220  |
| 10             | cagcaaaag  | c aggacgacgg | ccggggtctg | gtgcttcctg | gctacaagta | cctcggaccc | 2280  |
|                | ttcaacgga  | c tcgacaaggg | ggagcćcgtc | aacgcggcgg | acgcagcggc | cctcgagcac | 2340  |
|                | ggcaaggcc  | t acgaccagca | gctgcaggcg | ggtgacaatc | cgtacctgcg | gtataaccac | 2400  |
| 15             | gccgacgccg | g agtttcagga | gcgtctgcaa | gaagatacgt | cttttggggg | caacctcggg | 2460  |
|                | cgagcagtct | tccaggccaa   | gaagcgggtt | ctcgaacctc | toggtotggt | tgaggaaggc | 2520  |
|                | gctaagacg  | ; ctcctggaaa | gaagagaccg | gtagagccat | caccccagcg | ttctccagac | 2580  |
| 20             | tectetacge | g gcatcggcaa | gaaaggccaa | cagcccgcca | gaaaaagact | caattttggt | 2640  |
|                | cagactggcg | , actcagagtc | agttccagac | cctcaacctc | tcggagaacc | tscagcagcg | 2700  |
|                | ccctctggtg | tgggacctaa   | tacaatggct | gcaggcggtg | gcgcaccaat | ggcagacaat | 27 60 |
| 25             | aacgaaggcg | ccgacggagt   | gggtaattcc | tcgggaaatt | ggcattgcga | ttccacatgg | 2820  |
|                | ctgggggaca | gagtcatcac   | caccagcacc | cgaacctggg | cattgcccac | ctacaacaac | 2880  |
|                | cacctctaca | agcaaatctc   | caatggaaca | tcgggaggaa | gcaccaacga | caacacctac | 2940  |
| 30             | tttggctaca | gcaccccctg   | ggggtatttt | gacttcaaca | gattccactg | ccacttctca | 3000  |
|                | ccacgtgact | ggcagcgact   | catcaacaac | aactggggat | tccggccaaa | gagactcaac | 3060  |
| 25             | ttcaagctgt | tcaacatcca   | ggtcaaggag | gttacgacga | acgaaggcac | caagaccatc | 3120  |
| <i>35</i><br>` | gccaataacc | ttaccagcac   | cgtccaggtc | tttacggact | cggagtacca | gctaccgtac | 3180  |
|                | gtcctaggct | ctgcccacca   | aggatgcctg | ccaccgtttc | ctgcagacgt | cttcatggtt | 3240  |
| 40             | cctcagtacg | gctacctgac   | gctcaacaat | ggaagtcaag | cgttaggacg | ttcttctttc | 3300  |
| 40             | tactgtctgg | aatacttccc   | ttctcagatg | ctgagaaccg | gcaacaactt | tcagttcagc | 3360  |
|                | tacactttcg | aggacgtgcc   | tttccacagc | agctacgcac | acagccagag | tctagatcga | 3420  |
| 45             | ctgatgaacc | ccctcatcga   | ccagtaccta | tactacctgg | tcagaacaca | gacaactgga | 3480  |
| 40             | actgggggaa | ctcaaacttt   | ggcattcagc | caagcaggcc | ctagctcaat | ggccaatcag | 3540  |
|                | gctagaaact | gggtacccgg   | gccttgctac | cgtcagcagc | gcgtctccac | aaccaccaac | 3600  |
| 50             | caaaataaca | acagcaactt   | tgcgtggacg | ggagctgcta | aattcaagct | gaacgggaga | 3660  |
|                | gactcgctaa | tgaatcctgg   | cgtggctatg | gcatcgcaca | aagacgacga | ggaccgcttc | 3720  |
|                | tttccatcaa | gtggcgttct   | catatttggc | aagcaaggag | ccgggaacga | tggagtcgac | 3780  |
| 55             | tacagecagg | tgctgattac   | agatgaggaa | gaaattaaag | ccaccaaccc | tgtagccaca | 3840  |
| -              |            |              |            |            |            |            |       |

|    | gaggaatacg              | gagcagtggc         | catcaacaac | : caggccgcta | acacgcaggo | gcaaactgga               | 3 900      |
|----|-------------------------|--------------------|------------|--------------|------------|--------------------------|------------|
| •  | cttgtgcata              | accagggagt         | tattcctggt | atggtctggc   | agaaccggga | cgtgtacctg               | 3960       |
| 5  | cagggcccta              | tttgggctaa         | aatacctcac | acagatggca   | actttcacco | gtotoctotg               | 4020       |
|    | atgggtggat              | ttggactgaa         | acacccacct | ccacagatto   | taattaaaaa | tacaccagtg               | 4080       |
| 10 | ccggcagatc              | ctcctcttac         | cttcaatcaa | gccaagctga   | actctttcat | : cacgcagtac             | 4140       |
| 10 | agcacgggac              | aagtcagcgt         | ggaaatcgag | tgggagctgc   | agaaagaaaa | cagcaagcgc               | 4200       |
|    | tggaatccag              | agatccagta         | tacttcaaac | tactacaaat   | ctacaaatgt | ggactttgct               | 4260       |
| 15 | gtcaatacca              | aaggtgttta         | ctctgagcct | cgccccattg   | gtactcgtta | cctcacccgt               | 4320       |
|    | aatttgtaat              | tgcctgttaa         | tcaataaacc | ggttaattcg   | tttcagttga | actttggtct               | 4380       |
|    | ctgcg                   |                    |            |              |            |                          | 4385       |
| 20 |                         |                    |            |              |            |                          |            |
|    | <210> 6                 |                    |            |              |            |                          |            |
|    | <211> 4718<br><212> DNA |                    |            |              |            |                          |            |
| 25 | <213> adeno-asso        | ciated virus serot | type 1     |              |            |                          |            |
|    | <400> 6                 |                    |            |              |            |                          |            |
|    | ********                |                    |            |              | ·          |                          |            |
| 30 |                         |                    |            |              |            | aaaggtccgc               | 60         |
|    |                         |                    |            |              |            | agagggagtg<br>tcagcgctga | 120        |
|    |                         |                    |            |              |            | cttttgcgac               | 180<br>240 |
| 35 |                         |                    |            |              |            | gcaggatctc               | 300        |
|    |                         |                    |            |              |            | agatogtgat               | 360        |
|    |                         |                    |            |              |            | ttgtgagetg               | 420        |
| 40 |                         | aaggaatggg         |            |              |            |                          | 480        |
|    |                         | ctgaccgtgg         |            |              |            |                          | 540        |
|    |                         | gccccggagg         |            |              |            |                          | 600        |
| 45 |                         | attctggtgg         |            |              |            | •                        | 660        |
|    |                         | agggacaagc         |            |              |            |                          | 720        |
|    |                         | gcggtgacca         |            |              |            |                          | 780        |
| 50 |                         | atccccaact         |            |              |            |                          | 840        |
|    |                         | gaggagtata         |            |              |            |                          | 900        |
|    |                         | ctgacccacg         |            |              |            |                          | 960        |
| 55 |                         | gcgcctgtca         |            |              |            |                          | 1020       |
|    |                         |                    |            |              | J          | 72923                    |            |

gtggctggtg gaccggggca tcacctccga gaagcagtgg atccaggagg accaggcctc 1080

| gtacatoto  | c ttcaacgcc  | g cttccaact | c gcggtccca         | g atcaaggcc  | g ctctggacaa | 1140  |
|------------|--------------|-------------|---------------------|--------------|--------------|-------|
| tgccggcaa  | g atcatggcg  | tgaccaaat   | c cgcgcccga         | c tacctggta  | g gccccgctcc | 1200  |
| gcccgcgga  | c attamaacc  | a accgcatct | a cogcatect         | g gagctgaac  | gctacgaacc   | 1260  |
| tgcctacgc  | ggeteegtet   | ttotoggot   | g ggcccagaa         | a aggttcggg  | agcgcaacac   | 1320  |
| catctggct  | g tttgggccgg | ccaccacgg   | g cajagaccaad       | atogoggaag   | ; ccatcgccca | 1380  |
| cgccgtgcc  | ttctacggct   | gegteaact   | g gaccaatga         | aactttccct   | tcaatgattg   | 1440  |
| cgtcgacaaç | , atggtgatct | ggtgggagga  | gggcaagat           | acggccaagg   | tegtggagte   | 1500  |
| cgccaaggc  | attctcggcg   | gcagcaaggt  | gcgcgtggad          | : caaaagtgca | agtcgtccgc   | 1560  |
| ccagatcgac | : cccaccccg  | tgatcgtcac  | ctccaacacc          | : aacatgtgcg | ccgtgattga   | 1620  |
| cgggaacagc | accaccttcg   | agcaccagca  | gccgttgcag          | gaccggatgt   | tcaaatttga   | 1680  |
| actcacccgc | cgtctggagc   | atgactttgg  | caaggtgaca          | aagcaggaag   | tcaaagagtt   | 1740  |
| cttccgctgg | gcgcaggatc   | acgtgaccga  | ggtggcgcat          | gagttctacg   | tcagaaaggg   | 1800  |
| tggagccaac | aaaagacccg   | cccccgatga  | cgcggataaa          | agcgagccca   | agcgggcctg   | 1860  |
| cccctcagtc | gcggatccat   | cgacgtcaga  | cgcggaagga          | gctccggtgg   | actttgccga   | 1920  |
| caggtaccaa | aacaaatgtt   | ctcgtcacgc  | gggcatgctt          | cagatgctgt   | ttccctgcaa   | 1980  |
| gacatgcgag | agaatgaatc   | agaatttcaa  | catttgcttc          | acgcacggga   | cgagagactg   | 2040  |
| ttcagagtgc | ttccccggcg   | tgtcagaatc  | tcaaccggtc          | gtcagaaaga   | ggacgtatcg   | 2100  |
| gaaactctgt | gccattcatc   | atctgctggg  | gc <b>g</b> ggctccc | gagattgctt   | gctcggcctg   | 2160  |
| cgatctggtc | aacgtggacc   | tggatgactg  | tgtttctgag          | caataaatga   | cttaaaccag   | 2220  |
| gtatggctgc | cgatggttat   | cttccagatt  | ggctcgagga          | caacctctct   | gagggcattc   | 2280  |
| gcgagtggtg | ggacttgaaa   | cctggagccc  | cgaagcccaa          | agccaaccag   | caaaagcagg   | 2340  |
| acgacggccg | gggtctggtg   | cttcctggct  | acaagtacct          | cggacccttc   | aacggactcg   | 2400  |
| acaaggggga | gcccgtcaac   | gcggcggacg  | cagcggccct          | cgagcacgac   | aaggcctacg   | 2460  |
| accagcagct | caaagcgggt   | gacaatccgt  | acctgcggta          | taaccacgcc   | gacgccgagt   | 2.520 |
| ttcaggagcg | tctgcaagaa   | gatacgtctt  | tt <b>g</b> ggggcaa | cctcgggcga   | gcagtcttcc   | 2580  |
| aggccaagaa | gcgggttctc   | gaacctctcg  | gtctggttga          | ggaaggcgct   | aagacggctc   | 2.640 |
| ctggaaagaa | acgtccggta   | gagcagtcgc  | cacaagagcc          | agactcctcc   | tcgggcatcg   | 2700  |
| gcaagacagg | ccagcagccc   | gctaaaaaga  | gactcaattt          | tggtcagact   | ggcgactcag   | 2760  |
| agtcagtccc | cgatccacaa   | cctctcggag  | aacctccagc          | aacccccgct   | gctgtgggac   | 2820  |
| ctactacaat | ggcttcaggc   | ggtggcgcac  | caatggcaga          | caataacgaa   | ggcgccgacg   | 2880  |
| gagtgggtaa | tgcctcagga   | aattggcatt  | gcgattccac          | atggctgggc   | gacagagtca   | 2940  |
| tcaccaccag | cacccgcacc   | tgggccttgc  | ccacctacaa          | taaccacctc   | tacaagcaaa   | 3000  |

|    | tctccagtg  | c ttcaacgggg | gccagcaac  | g acaaccact  | a cttcggctac | agcaccccct | 30 60 |
|----|------------|--------------|------------|--------------|--------------|------------|-------|
| 5  | gggggtatt  | t tgatttcaac | agattccact | gccactttt:   | c accacgtgac | tggcagcgac | 3120  |
| 3  | tcatcaaca  | a caattgggga | ttccggccca | a agagactca  | a cttcaaactc | ttcaacatcc | 3180  |
|    | aagtcaagg  | a ggtcacgacg | aatgatggc  | tcacaaccat   | cgctaataac   | cttaccagca | 3240  |
| 10 | cggttcaag  | t cttctcggac | tcggagtaco | agcttccgt    | cgtcctcggc   | totgogoaco | 3300  |
|    | agggctgcct | t cocteegtte | ccggcggacg | f tgttcatgat | tccgcaatac   | ggctacctga | 3360  |
|    | cgctcaacaa | a tggcagccaa | gccgtgggac | gttcatcctt   | ttactgcctg   | gaatatttcc | 3420  |
| 15 | cttctcagat | gctgagaacg   | ggcaacaact | ttaccttcag   | ctacaccttt   | gaggaagtgc | 3480  |
|    | ctttccacag | g cagctacgcg | cacagccaga | gcctggaccg   | gctgatgaat   | cctctcatcg | 3540  |
|    | accaatacct | gtattacctg   | aacagaactc | aaaatcagtc   | cggaagtgcc   | caaaacaagg | 3600  |
| 20 | acttgctgtt | tagccgtggg   | tctccagctg | gcatgtctgt   | tcagcccaaa   | aactggctac | 3660  |
|    | ctggaccctg | ttatcggcag   | cagcgcgttt | ctaaaacaaa   | aacagacaac   | aacaacagca | 3720  |
|    | attttacctg | gactggtgct   | tcaaaatata | acctcaatgg   | gcgtgaatcc   | atcatcaacc | 3780  |
| 25 | ctggcactgc | tatggcctca   | cacaaagacg | acgaagacaa   | gttctttccc   | atgagcggtg | 3840  |
| •  | tcatgatttt | tggaaaagag   | agcgccggag | cttcaaacac   | tgcattggac   | aatgtcatga | 3900  |
|    | ttacagacga | agaggaaatt   | aaagccacta | accctgtggc   | caccgaaaga   | tttgggaccg | 3960  |
| 30 | tggcagtcaa | tttccagagc   | agcagcacag | accctgcgac   | cggagatgtg   | catgctatgg | 4020  |
|    | gagcattacc | tggcatggtg   | tggcaagata | gagacgtgta   | cctgcagggt   | cccatttggg | 4080  |
|    | ccaaaattcc | tcacacagat   | ggacactttc | accegtetee   | tcttatgggc   | ggctttggac | 4140  |
| 35 | tcaagaaccc | gcctcctcag   | atcctcatca | aaaacacgcc   | tgttcctgcg   | aatcctccgg | 4200  |
|    | cggagttttc | agctacaaag   | tttgcttcat | tcatcaccca   | atactccaca   | ggacaagtga | 4260  |
|    | gtgtggaaat | tgaatgggag   | ctgcagaaag | aaaacagcaa   | gcgctggaat   | cccgaagtgc | 4320  |
| 40 | agtacacatc | caattatgca   | aaatctgcca | acgttgattt   | tactgtggac   | aacaatggac | 4380  |
|    | tttatactga | gcctcgcccc   | attggcaccc | gttaccttac   | ccgtcccctg   | taattacgtg | 4440  |
|    | ttaatcaata | aaccggttga   | ttcgtttcag | ttgaactttg   | gtctcctgtc   | cttcttatct | 4500  |
| 45 | tatcggttac | catggttata   | gcttacacat | taactgcttg   | gttgcgcttc   | gcgataaaag | 4560  |
|    | acttacgtca | tcgggttacc   | cctagtgatg | gagttgccca   | ctccctctct   | gcgcgctcgc | 4620  |
| •  | tegeteggtg | gggcctgcgg a | accaaaggtc | cgcagacggc   | agagetetge   | tctgccggcc | 4680  |
| 50 | ccaccgagcg | agcgagcgcg d | cagagagga  | gtgggcaa     |              |            | 4718  |

```
<210> 7
<211> 4675
<212> DNA
<213> adeno-associated virus serotype 2
```

<sup>&</sup>lt;400> 7

| ttggccacto | cctctctgcg | cgctcgctcg | ctcactgagg | ccgggcgacc | aaaggtcgcc | 60   |
|------------|------------|------------|------------|------------|------------|------|
| cgacgcccg  | gctttgcccg | ggcggcctca | gtgagcgagc | gagcgcgcag | agagggagtg | 120  |
| gccaactcca | tcactagggg | ttcctggagg | ggtggagtcg | tgacgtgaat | tacgtcatag | 180  |
| ggttagggag | gtcctgtatt | agaggtcacg | tgagtgtttt | gcgacatttt | gcgacaccat | 240  |
| gtggtcacgo | tgggtattta | agcccgagtg | agcacgcagg | gtctccattt | tgaagcggga | 300  |
| ggtttgaacg | cgcagccgcc | atgccggggt | tttacgagat | tgtgattaag | gtccccagcg | 360  |
| accttgacgg | gcatctgccc | ggcatttctg | acagctttgt | gaactgggtg | gccgagaagg | 420  |
| aatgggagtt | gccgccagat | tctgacatgg | atctgaatct | gattgagcag | gcacccctga | 480  |
| ccgtggccga | gaagctgcag | cgcgactttc | tgacggaatg | gcgccgtgtg | agtaaggccc | 540  |
| cggaggccct | tttctttgtg | caatttgaga | agggagagag | ctacttccac | atgcacgtgc | 600  |
| tcgtggaaac | caccggggtg | aaatccatgg | ttttgggacg | tttcctgagt | cagattcgcg | 660  |
| aaaaactgat | tcagagaatt | taccgcggga | tcgagccgac | tttgccaaac | tggttcgcgg | 720  |
| tcacaaagac | cagaaatggc | gccggaggcg | ggaacaaggt | ggtggatgag | tgctacatcc | 780  |
| ccaattactt | gctcccaaa  | acccagectg | agctccagtg | ggcgtggact | aatatggaac | 840  |
| agtatttaag | cgcctgtttg | aatctcacgg | agcgtaaacg | gttggtggcg | cagcatctga | 900  |
| cgcacgtgtc | gcagacgcag | gagcagaaca | aagagaatca | gaatcccaat | tctgatgcgc | 960  |
| cggtgatcag | atcaaaaact | tcagccaggt | acatggagct | ggtcgggtgg | ctcgtggaca | 1020 |
| aggggattac | ctcggagaag | cagtggatcc | aggaggacca | ggcctcatac | atctccttca | 1080 |
| atgcggcctc | caactcgcgg | tcccaaatca | aggctgcctt | ggacaatgcg | ggaaagatta | 1140 |
| tgagcctgac | taaaaccgcc | cccgactacc | tggtgggcca | gcagcccgtg | gaggacattt | 1200 |
| ccagcaatcg | gatttataaa | attttggaac | taaacgggta | cgatccccaa | tatgcggctt | 1260 |
| ccgtctttct | gggatgggcc | acgaaaaagt | tcggcaagag | gaacaccatc | tggctgtttg | 1320 |
| ggcctgcaac | taccgggaag | accaacatcg | cggaggccat | agcccacact | gtgcccttct | 1380 |
| acgggtgcgt | aaactggacc | aatgagaact | ttcccttcaa | cgactgtgtc | gacaagatgg | 1440 |
| tgatctggtg | ggaggagggg | aagatgaccg | ccaaggtcgt | ggagtcggcc | aaagccattc | 1500 |
| tcggaggaag | caaggtgcgc | gtggaccaga | aatgcaagtc | ctcggcccag | atagaccega | 1560 |
| ctcccgtgat | cgtcacctcc | aacaccaaca | tgtgcgccgt | gattgacggg | aactcaacga | 1620 |
| ccttcgaaca | ccagcagccg | ttgcaagacc | ggatgttcaa | atttgaactc | acccgccgtc | 1680 |
| tggatcatga | ctttgggaag | gtcaccaagc | aggaagtcaa | agactttttc | cggtgggcaa | 1740 |
| aggatcacgt | ggttgaggtg | gagcatgaat | tctacgtcaa | aaagggtgga | gccaagaaaa | 1800 |
| gacccgcccc | cagtgacgca | gatataagtg | agcccaaacg | ggtgcgcgag | tcagttgcgc | 1860 |
| agccatcgac | gtcagacgcg | gaagcttcga | tcaactacgc | agacaggtac | caaaacaaat | 1920 |
|            |            |            |            |            |            |      |

|   | gttctcgtca | cgtgggcatg | aatctgatgo | tgtttccctg | , cagacaatge | gagagaatga | 1980 |
|---|------------|------------|------------|------------|--------------|------------|------|
|   | atcagaatto | aaatatctgc | ttcactcacg | gacagaaaga | ctgtttagag   | tgctttcccg | 2040 |
|   | tgtcagaatc | tcaacccgtt | tetgtegtea | aaaaggcgta | tcagaaactg   | tgctacattc | 2100 |
|   | atcatatcat | gggaaaggtg | ccagacgctt | gcactgcctg | gedectggte   | aatgtggatt | 2160 |
|   | tggatgactg | catctttgaa | caataaatga | tttaaatcag | gtatggctgc   | cgatggttat | 2220 |
| 1 | cttccagatt | ggctcgagga | cactctctct | gaaggaataa | gacagtggtg   | gaagctcaaa | 2280 |
|   | cctggcccac | caccaccaaa | gcccgcagag | cggcataagg | acgacagcag   | gggtcttgtg | 2340 |
|   | cttcctgggt | acaagtacct | cggacccttc | aacggactcg | acaagggaga   | gccggtcaac | 2400 |
|   | gaggcagacg | ccgcggccct | cgagcacgta | caaagcctac | gaccggcagc   | tcgacagcgg | 2460 |
|   | agacaacccg | tacctcaagt | acaaccacgc | cgacgcggag | tttcaggagc   | gccttaaaga | 2520 |
|   | agatacgtct | tttgggggca | acctcggacg | agcagtcttc | caggcgaaaa   | agagggttct | 2580 |
|   | tgaacctctg | ggcctggttg | aggaacctgt | taagacggct | ccgggaaaaa   | agaggccggt | 2640 |
| • | agagcactct | cctgtggagc | cagactcctc | ctcgggaacc | ggaaaggcgg   | gccagcagcc | 2700 |
|   | tgcaagaaaa | agattgaatt | ttggtcagac | tggagacgca | gactcagtac   | ctgaccccca | 2760 |
|   | gcctctcgga | cagccaccag | cagoccocto | tggtctggga | actaatacga   | tggctacagg | 2820 |
|   | cagtggcgca | ccaatggcag | acaataacga | gggcgccgac | ggagtgggta   | attecteegg | 2880 |
|   | aaattggcat | tgcgattcca | catggatggg | cgacagagtc | atcaccacca   | gcacccgaac | 2940 |
|   | ctgggccctg | cccacctaca | acaaccacct | ctacaaacaa | atttccagcc   | aatcaggagc | 3000 |
|   | ctcgaacgac | aatcactact | ttggctacag | caccccttgg | gggtattttg   | acttcaacag | 3060 |
|   | attccactgc | cacttttcac | cacgtgactg | gcaaagactc | atcaacaaca   | actggggatt | 3120 |
|   | ccgacccaag | agactcaact | tcaagctctt | taacattcaa | gtcaaagagg   | tcacgcagaa | 3180 |
|   | tgacggtacg | acgacgattg | ccaataacct | taccagcacg | gttcaggtgt   | ttactgactc | 3240 |
|   | ggagtaccag | ctcccgtacg | tcctcggctc | ggcgcatcaa | ggatgcctcc   | cgccgttccc | 3300 |
|   | agcagacgtc | ttcatggtgc | cacagtatgg | atacctcacc | ctgaacaacg   | ggagtcaggc | 3360 |
|   | agtaggacgc | tcttcatttt | actgcctgga | gtactttcct | tctcagatgc   | tgcgtaccgg | 3420 |
|   | aaacaacttt | accttcagct | acacttttga | ggacgttcct | ttccacagca   | gctacgctca | 3480 |
|   | cagccagagt | ctggaccgtc | tcatgaatcc | tctcatcgac | cagtacctgt   | attacttgag | 3540 |
|   | cagaacaaac | actccaagtg | gaaccaccac | gcagtcaagg | cttcagtttt   | ctcaggccgg | 3600 |
|   | agcgagtgac | attcgggacc | agtctaggaa | ctggcttcct | ggaccctgtt   | accgccagca | 3660 |
|   | gcgagtatca | aagacatctg | cggataacaa | caacagtgaa | tactcgtgga   | ctggagctac | 3720 |
|   | caagtaccac | ctcaatggca | gagactetet | ggtgaatccg | gccatggcaa   | gccacaagga | 3780 |
|   | cgatgaagaa | aagttttttc | ctcagagcgg | ggttctcatc | tttgggaagc   | aaggctcaga | 3840 |

| gaaaacaaat | gtgaacattg | aaaaggtcat | gattacagac | gaagaggaaa | tcggaacaac | 3 900 |
|------------|------------|------------|------------|------------|------------|-------|
| caatcccgtg | gctacggagc | agtatggttc | tgtatctacc | aacctccaga | gaggcaacag | 3 960 |
| acaagcagct | accgcagatg | tcaacacaca | aggcgttctt | ccaggcatgg | tctggcagga | 4020  |
| cagagatgtg | taccttcagg | ggcccatctg | ggcaaagatt | ccacacacgg | acggacattt | 4080  |
| tcaccctct  | cccctcatgg | gtggattcgg | acttaaacac | cctcctccac | agattotoat | 4140  |
| caagaacacc | ccggtacctg | cgaatccttc | gaccaccttc | agtgcggcaa | agtttgcttc | 4200  |
| cttcatcaca | cagtactcca | cgggacacgg | tcagcgtgga | gatcgagtgg | gagctgcaga | 4260  |
| aggaaaacag | caaacgctgg | aatcccgaaa | ttcagtacac | ttccaactac | aacaagtctg | 4320  |
| ttaatcgtgg | acttaccgtg | gatactaatg | gcgtgtattc | agagcctcgc | cccattggca | 4380  |
| ccagatacct | gactcgtaat | ctgtaattgc | ttgttaatca | ataaaccgtt | taattogttt | 4440  |
| cagttgaact | ttggtctctg | cgtatttctt | tcttatctag | tttccatggc | tacgtagata | 4500  |
| agtagcatgg | cgggttaatc | attaactaca | aggaacccct | agtgatggag | ttggccactc | 4560  |
| cctctctgcg | cgctcgctcg | ctcactgagg | ccgggcgacc | aaaggtcgcc | cgacgcccgg | 4620  |
| gctttgcccg | ggcggcctca | gtgagcgagc | gagcgcgcag | agagggagtg | gccaa      | 4675  |

<210> 8

5

10

15

20

25

35

40

45

50

55

<211> 4726

<212> DNA

30 <213> adeno-associated virus serotype 3

#### <400> 8

ttggccactc cototatgcg cactogotog ctcggtgggg cotggcgacc amaggtcgcc 60 agacggacgt getttgcacg teeggeeeca cegagegage gagtgegeat agagggagtg 120 gccaactcca tcactagagg tatggcagtg acgtaacgcg aagcgcgcga agcgagacca 180 cgcctaccag ctgcgtcagc agtcaggtga cccttttgcg acagtttgcg acaccacgtg gccgctgagg gtatatattc tcgagtgagc gaaccaggag ctccattttg accgcgaaat 300 ttgaacgagc agcagccatg ccggggttct acgagattgt cctgaaggtc ccgagtgacc 360 tggacgagcg cctgccgggc atttctaact cgtttgttaa ctgggtggcc gagaaggaat 420 gggacgtgcc gccggattct gacatggatc cgaatctgat tgagcaggca cccctgaccg 480 tggccgaaaa gcttcagcgc gagttcctgg tggagtggcg ccgcgtgagt aaggccccgg 540 aggeeetett ttttgteeag ttegaaaagg gggagaeeta etteeacetg caegtgetga 600 ttgagaccat cggggtcaaa tccatggtgg tcggccgcta cgtgagccag attaaagaga 660 agetggtgac cegeatetac egeggggteg agecgeaget teegaactgg ttegeggtga 720 ccaaaacgcg aaatggcgcc gggggcggga acaaggtggt ggacgactgc tacatcccca 780 actacctgct ccccaagacc cagcccgagc tccagtgggc gtggactaac atggaccagt 840

|     | atttaagcgc   | ctgtttgaat | ctcgcggagc | gtaaacggct | ggtggcgcag | catctgacgc | 900  |
|-----|--------------|------------|------------|------------|------------|------------|------|
| _   | acgtgtcgca   | gacgcaggag | cagaacaaag | agaatcagaa | ccccaattct | gacgcgccgg | 960  |
| 5   | tcatcaggtc   | aaaaacctca | gccaggtaca | tggagctggt | cgggtggctg | gtggaccgcg | 1020 |
|     | ggatcacgtc   | agaaaagcaa | tggattcagg | aggaccaggc | ctcgtacatc | tccttcaacg | 1080 |
| 10  | ccgcctccaa   | ctcgcggtcc | cagatcaagg | ccgcgctgga | caàtgcctòc | aagatcatga | 1140 |
| 10  | gcctgacaaa   | gacggctccg | gactacctgg | tgggcagcaa | cccgccggag | gacattacca | 1200 |
|     | aaaatcggat   | ctaccaaatc | ctggagctga | acgggtacga | tccgcagtac | geggeeteeg | 1260 |
| 15  | tetteetggg   | ctgggcgcaa | aagaagttcg | ggaagaggaa | caccatctgg | ctctttgggc | 1320 |
| ,,, | cggccacgac   | gggtaaaacc | aacatcgcgg | aagccatcgc | ccacgccgtg | cccttctacg | 1380 |
|     | gctgcgtaaa   | ctggaccaat | gagaactttc | ccttcaacga | ttgcgtcgac | aagatggtga | 1440 |
| 20  | - tctggtggga | ggagggcaag | atgacggcca | aggtcgtgga | gagcgccaag | gccattctgg | 1500 |
|     | gcggaagcaa   | ggtgcgcgtg | gaccaaaagt | gcaagtcatc | ggcccagatc | gaacccactc | 1560 |
|     | ccgtgatcgt   | cacctccaac | accaacatgt | gcgccgtgat | tgacgggaac | agcaccacct | 1620 |
| 25  | tcgagcatca   | gcagccgctg | caggaccgga | tgtttgaatt | tgaacttacc | cgccgtttgg | 1680 |
| • • | accatgactt   | tgggaaggtc | accaaacagg | aagtaaagga | ctttttccgg | tgggcttccg | 1740 |
| •   | atcacgtgac   | tgacgtggct | catgagttct | acgtcagaaa | gggtggagct | aagaaacgcc | 1800 |
| 30  | ccgcctccaa   | tgacgcggat | gtaagcgagc | casascggga | gtgcacgtca | cttgcgcagc | 1860 |
|     | cgacaacgtc   | agacgcggaa | gcaccggcgg | actacgcgga | caggtaccaa | aacaaatgtt | 1920 |
|     | ctcgtcacgt   | gggcatgaat | ctgatgcttt | ttccctgtaa | aacatgcgag | agaatgaatc | 1980 |
| 35  | aaatttccaa   | tgtctgtttt | acgcatggtc | aaagagactg | tggggaatgc | ttccctggaa | 2040 |
|     | tgtcagaatc   | tcaacccgtt | tctgtcgtca | aaaagaagac | ttatcagaaa | ctgtgtccaa | 2100 |
|     | ttcatcatat   | cctgggaagg | gcacccgaga | ttgcctgttc | ggcctgcgat | ttggccaatg | 2160 |
| 40  | tggacttgga   | tgactgtgtt | tctgagcaat | aaatgactta | aaccaggtat | ggctgctgac | 2220 |
|     | ggttatcttc   | cagattggct | cgaggacaac | ctttctgaag | gcattcgtga | gtggtgggct | 2280 |
|     | ctgaaacctg   | gagtccctca | acccaaagcg | aaccaacaac | accaggacaa | ccgtcggggt | 2340 |
| 45  | cttgtgcttc   | cgggttacaa | atacctcgga | cccggtaacg | gactcgacaa | aggagagccg | 2400 |
|     | gtcaacgagg   | cggacgcggc | agccctcgaa | cacgacaaag | cttacgacca | gcagctcaag | 2460 |
|     | gccggtgaca   | accegtacet | caagtacaac | cacgccgacg | ccgagtttca | ggagcgtctt | 2520 |
| 50  | caagaagata   | cgtcttttgg | gggcaacctt | ggcagagcag | tcttccaggc | caaaaagagg | 2580 |
|     | atccttgagc   | ctcttggtct | ggttgaggaa | gcagctaaaa | cggctcctgg | aaagaagggg | 2640 |
|     | gctgtagatc   | agtotootca | ggaaccggac | tcatcatctg | gtgttggcaa | atcgggcaaa | 2700 |
| 55  | cagectgeca   | gaaaaagact | aaatttcggt | cagactggag | actcagagtc | agtcccagac | 2760 |

|   | cctcaacctc | tcggagaacc | accagcagco | cccacaagtt | tgggatctaa | tacaatggct | 2820  |
|---|------------|------------|------------|------------|------------|------------|-------|
|   | tcaggcggtg | gcgcaccaat | ggcagacaat | aacgagggtg | ccgatggagt | gggtaattcc | 2880  |
|   | tcaggaaatt | ggcattgcga | ttcccaatgg | ctgggcgaca | gagtcatcac | caccagcacc | 2940  |
|   | agaacctggg | ccctgcccac | ttacaacaac | catctctaca | agcaaatctc | cagccaatca | 3000  |
|   | ggagcttcaa | acgacaacca | ctactttggc | tacagcaccc | cttgggggta | ttttgacttt | 3060, |
|   | aacagattcc | actgccactt | ctcaccacgt | gactggcagc | gactcattaa | caacaactgg | 3120  |
|   | ggattccggc | ccaagaaact | cagcttcaag | ctcttcaaca | tccaagttag | aggggtcacg | 3180  |
|   | cagaacgatg | gcacgacgac | tattgccaat | aaccttacca | gcacggttca | agtgtttacg | 3240  |
|   | gactcggagt | atcagctccc | gtacgtgctc | gggtcggcgc | accaaggctg | tetecegeeg | 3300  |
|   | tttccagcgg | acgtcttcat | ggtccctcag | tatggatacc | tcaccctgaa | caacggaagt | 3360  |
|   | caagcggtgg | gacgctcatc | cttttactgc | ctggagtact | tcccttcgca | gatgctaagg | 3420  |
|   | actggaaata | acttccaatt | cagctatacc | ttcgaggatg | taccttttca | cagcagctac | 3480  |
|   | gctcacagcc | agagtttgga | tcgcttgatg | aatcctctta | ttgatcagta | tctgtactac | 3540  |
|   | ctgaacagaa | cgcaaggaac | aacctctgga | acaaccaacc | aatcacggct | gctttttagc | 3600  |
|   | caggctgggc | ctcagtctat | gtctttgcag | gccagaaatt | ggctacctgg | gccctgctac | 3660  |
|   | cggcaacaga | gactttcaaa | gactgctaac | gacaacaaca | acagtaactt | tccttggaca | 3720  |
|   | gcggccagca | aatatcatct | caatggccgc | gactcgctgg | tgaatccagg | accagetatg | 3780  |
|   | gccagtcaca | aggacgatga | agaaaaattt | ttccctatgc | acggcaatct | aatatttggc | 3840  |
|   | aaagaaggga | caacggcaag | taacgcagaa | ttagataatg | taatgattac | ggatgaagaa | 3900  |
|   | gagattcgta | ccaccaatcc | tgtggcaaca | gagcagtatg | gaactgtggc | aaataacttg | 3960  |
| : | cagageteaa | atacagetee | cacgactgga | actgtcaatc | atcagggggc | cttacctggc | 4020  |
|   | atggtgtggc | aagatcgtga | cgtgtacctt | caaggaccta | tctgggcaaa | gattcctcac | 4080  |
|   | acggatggac | actttcatcc | ttctcctctg | atgggaggct | ttggactgaa | acatccgcct | 4140  |
|   | cctcaaatca | tgatcaaaaa | tactccggta | ccggcaaatc | ctccgacgac | tttcagcccg | 4200  |
|   | gccaagtttg | cttcatttat | cactcagtac | tccactggac | aggtcagcgt | ggaaattgag | 4260  |
|   | tgggagctac | agaaagaaaa | cagcaaacgt | tggaatccag | agattcagta | cacttccaac | 4320  |
|   | tacaacaagt | ctgttaatgt | ggactttact | gtagacacta | atggtgttta | tagtgaacct | 4380  |
|   | cgccctattg | gaacccggta | tctcacacga | aacttgtgaa | tcctggttaa | tcaataaacc | 4440  |
|   | gtttaattcg | tttcagttga | actttggctc | ttgtgcactt | ctttatcttt | atcttgtttc | 4500  |
|   | catggctact | gcgtagataa | gcagcggcct | gcggcgcttg | cgcttcgcgg | tttacaactg | 4560  |
|   | ctggttaata | tttaactctc | gccatacctc | tagtgatgga | gttggccact | ccctctatgc | 4620  |
|   | gcactcgctc | gctcggtggg | gcctggcgac | caaaggtcgc | cagacggacg | tgctttgcac | 4680  |
|   |            |            |            |            |            |            |       |

|           | gtccggcccc                         | accgagcgag      | cgagtgcgca   | tagagggagt | ggccaa     |            | 4726 |
|-----------|------------------------------------|-----------------|--------------|------------|------------|------------|------|
| 5         | <210> 9<br><211> 3098<br><212> DNA |                 |              |            |            |            |      |
|           | <213> new AAV s                    | serotype, clone | 42.2         |            |            | •          |      |
| 10        | <400> 9                            |                 |              |            |            |            |      |
|           | gaattcgccc                         | tttctacgg       | tgcgtcaact   | ggaccaatga | gaactttccc | ttcaacgatt | 60   |
| 15        | gcgtcgacaa                         | gatggtgat       | : tggtgggagg | agggcaagat | gacggccaag | gtcgtggagt | 120  |
| 15        | ccgccaaggc                         | cattctcggc      | ggcagcaagg   | tgcgcgtgga | ccaaaagtgc | aagtcttccg | 180  |
|           | cccagatcga                         | toccaccocc      | gtgatcgtca   | cttccaacac | caacatgtgc | gctgtgattg | 240  |
| 20        | acgggaacag                         | caccacette      | gagcaccagc   | agccgttaca | agaccggatg | ttcaaatttg | 300  |
| 20        | aactcacccg                         | ccgtctggag      | cacgactttg   | gcaaggtgac | aaagcaggaa | gtcaaagagt | 360  |
|           | tcttccgctg                         | ggcgcaggat      | cacgtgaccg   | aggtggcgca | tgagttctac | gtcagaaagg | 420  |
| 25        | gtggagccaa                         | caagagaccc      | gcccccgatg   | acgcggataa | aagcgagccc | aagcgggcct | 480  |
|           | gcccctcagt                         | cgcggatcca      | tcgacgtcag   | acgcggaagg | agctccggtg | gactttgccg | 540  |
|           | acaggtacca                         | aaacaaatgt      | tctcgtcacg   | cgggcatgct | tcagatgctg | tttccctgca | 600  |
| <i>30</i> | agacatgcga                         | gagaatgaat      | cagaatttca   | acatttgctt | cacgcacggg | accagagact | 660  |
| •         | gttcagaatg                         | tttccccggc      | gtgtcagaat   | ctcaaccggt | cgtcagaaag | aggacgtatc | 720  |
|           | ggaaactctg                         | tgccattcat      | catctgctgg   | ggcgggctcc | cgagattgct | tgctcggcct | 780  |
| 35        | gcgatctggt                         | caacgtggac      | ctggatgacc   | gtgtttctga | gcaataaatg | acttaaacca | 840  |
|           | ggtatggctg                         | ccgatggtta      | tcttccagat   | tggctcgagg | acaacctctc | tgagggcatt | 900  |
|           | cgcgagtggt                         | gggacttgaa      | acctggagcc   | ccgaaaccca | aagccaacca | gcaaaagcag | 960  |
| 40        | gacgacggcc                         | ggggtctggt      | gcttcctggc   | tacaagtacc | tcggaccctt | caacggactc | 1020 |
|           | gacaagggag                         | agccggtcaa      | cgaggcagac   | gccgcggccc | tcgagcacga | caaggcctac | 1080 |
|           | gacaagcagc                         | tcgagcaggg      | ggacaacccg   | tacctcaagt | acaaccacgc | cgacgccgag | 1140 |
| 45        | tttcaggagc                         | gtcttcaaga      | agatacgtct   | tttgggggca | acctcgggcg | agcagtcttc | 1200 |
|           | caggccaaga                         | agcgggttct      | cgaacctctc   | ggtctggttg | aggaaggcgc | taagacggct | 1260 |
|           | cctggaaaga                         | agagacccat      | agaatccccc   | gactecteca | cgggcatcgg | caagaaaggc | 1320 |
| 50        | cagcagcccg                         | ctaaaaagaa      | gctcaacttt   | gggcagactg | gcgactcaga | gtcagtgccc | 1380 |
|           | gaccccaac                          | ctctcggaga      | acctcccgcc   | gcgccctcag | gtctgggatc | tggtacaatg | 1440 |
|           | gctgcaggcg                         | gtggcgcacc      | aatggcagac   | aataacgaag | gcgccgacgg | agtgggtaat | 1500 |
| 55        | gcctccggaa                         | attggcattg      | cgattccaca   | tggctgggcg | acagagtcat | caccaccagc | 1560 |
|           | acccgcacct (                       | gggccctgcc      | cacctacaac   | aaccacctct | acaagcagat | atcaagtcag | 1620 |
|           | agcggggcta (                       | ccaacgacaa      | ccacttcttc   | ggctacagca | ccscctgggg | ctattttgac | 1680 |
|           | •                                  |                 |              |            |            |            |      |

|                | ttcaacagat tccactgcca cttctcacca cgtgactggc agcgactcat caacaacaac | 1740 |
|----------------|-------------------------------------------------------------------|------|
| 5              | tggggattcc ggcccagaaa gctgcggttc aagttgttca acatccaggt caaggaggtc | 1800 |
| 5              | acgacgaacg acggcgttac gaccateget aataacetta ccagcacgat tcaggtette | 1860 |
|                | teggactegg agtaceaact geogtacgte eteggetetg egeaceaggg etgeeteeet | 1920 |
| 10             | ccgttccctg cggacgtgtt catgattcct cagtacggat atctgactct aaacaacggc | 1980 |
|                | agtcagtctg tgggacgttc ctccttctac tgcctggagt actttccttc tcagatgctg | 2040 |
|                | agaacgggca ataactttga attcagctac acctttgagg aagtgccttt ccacagcagc | 2100 |
| 15             | tatgogoaca gocagagoot ggacoggotg atgaatoooc toatogacoa gtacotgtac | 2160 |
|                | tacctggccc ggacccagag cactacgggg tccacaaggg agctgcagtt ccatcaggct | 2220 |
|                | gggcccaaca ccatggccga gcaatcaaag aactggctgc ccggaccetg ttatcggcag | 2280 |
| 20             | cagagactgt caaaaaacat agacagcaac aacaacagta actttgcctg gaccggggcc | 2340 |
|                | actaaatacc atctgaatgg tagaaattca ttaaccaacc cgggcgtagc catggccacc | 2400 |
|                | aacaaggacg acgaggacca gttctttccc atcaacggag tgctggtttt tggcgaaacg | 2460 |
| -<br><b>25</b> | ggggctgcca acaagacaac gctggaaaac gtgctaatga ccagcgagga ggagatcaaa | 2520 |
|                | accaccaatc cogtggctac agaagaatac ggtgtggtct ccagcaacct gcaatcgtct | 2580 |
|                | acggccggac cccagacaca gactgtcaac agccaggggg ctctgcccgg catggtctgg | 2540 |
| 30             | cagaaccggg acgtgtacct gcagggtccc atctgggcca aaattcctca cacggacggc | 2700 |
|                | aactttcacc cgtctcccct gatgggcgga tttggactca aacacccgcc tcctcaaatt | 2760 |
|                | ctcatcaaaa acaccccggt acctgctaat cetecagagg tgtttactce tgccaagttt | 2820 |
| 35             | gcctcattta tcacgcagta cagcaccggc caggtcagcg tggagatcga gtgggaactg | 2880 |
|                | cagaaagaaa acagcaaacg ctggaatcca gagattcagt acacctcaaa ttatgccaag | 2940 |
|                | tctaataatg tggaatttgc tgtcaacaac gaaggggttt atactgagcc tcgccccatt | 3000 |
| 40             | ggcacccgtt acctcacccg taacctgtaa ttgcctgtta atcaataaac cggttaattc | 3060 |
|                | gtttcagttg aactttggtc tctgcgaagg gcgaattc                         | 3098 |
|                | <210> 10                                                          |      |
| 15             | <211> 3098                                                        |      |
|                | <212> DNA                                                         |      |
|                | <213> new AAV serotype, clone 16.3                                |      |
| 50             | <400> 10                                                          |      |
|                | gaattogooc ttogoagaga coaaagttoa actgaaacga atcaacoggt ttattgatta | 60   |
|                | acaagtaatt acaggttacg ggtgaggtaa cgggtgccaa tggggcgagg ctcagtataa | 120  |
| 55             | accentegt tgttgacage aaattecaca ttattagact tggcataatt tgaggtgtac  | 180  |
|                |                                                                   |      |
|                | tgaatetetg gattecageg tttgetgttt tetttetgea gtteceacte gatetecaeg | 240  |

|             | ctgacctggc | cggtgctgta   | ctgcgtgata | aatgaggcas | actaggcagg | agtaaacacc | 300   |
|-------------|------------|--------------|------------|------------|------------|------------|-------|
| 5           | cctggaggat | : tagcaggtac | cggggtgttt | ttgatgagaa | tttgaggagg | cgggtgtttg | 360   |
| J           | agtccaaato | cgcccatcag   | gggagacggg | tgaaagttgo | cgtccgtgtg | aggaattttg | 420   |
|             | gcccagatgg | gaccctgcag   | gtacacgtcc | cggttctgcc | agaccatgcc | gggcagagcc | 480   |
| 10          | ccctggctgt | tgacagtctg   | tgtctggggt | ccggccgtag | acgattgcag | gttgctggag | , 540 |
|             | accacaccgt | attettetgt   | agccacggga | ttggtggttt | tgatctcctc | ctcgctggtc | 600   |
|             | attagcacgt | tttccagcgt   | tgtcttgttg | gcagcccccg | ttttgccaaa | aaccagcact | 660   |
| 15          | ccgttgatgg | gaaagaactg   | gccctcgtcg | tccttgttgg | tggccatggc | tacgcccggg | 720   |
|             | ttggttaatg | aatttctacc   | attcagatgg | tatttagtgg | ccccggtcca | ggcaaagtta | .780  |
|             | ctgttgttgt | tgctgtctat   | gttttttgac | agtctctgct | gccgataaca | gggtccgggc | 840   |
| 20          | agccagttct | ttgattgctc   | ggccatggtg | ttgggcccag | cctgatggaa | ctgcagctcc | 900   |
|             | cttgtggacc | ccgtagtgct   | ctgggtccgg | gccaggtagt | acaggtactg | gtcgatgagg | 960   |
|             | ggattcatca | gccggtccag   | gctctggctg | tgcgcatagc | tgctgtggaa | aggcacttcc | 1020  |
| 25          | tcaaaggtgt | agctgaattc   | aaagttattg | cccgttctca | gcatctgaga | aggaaagtac | 1080  |
|             | tccaggcagt | agaaggagga   | acgtcccata | gactgactgc | cgttgtttag | agtcagatat | 1140  |
|             | ccgtactgag | gaatcatgaa   | cacgtccgca | gggaacggag | ggaggcagcc | ctggtgcgca | 1200  |
| 30          | gagccgagga | cgtacggcag   | ttggtactcc | gagtccgaga | agacctgaat | cgtgctggta | 1260  |
|             | aggttattag | cgatggtcgt   | aacgccgtcg | ttcgtcgtga | cctccttgac | ctggatgttg | 1320  |
|             | aacaacttga | accgcagctt   | tctgggccgg | aatccccagt | tgttgttgat | gagtcgctgc | 1380  |
| <i>35</i> . | cagtcacgtg | gtgagaagtg   | gcagtggaat | ctgttgaagt | caaaatagcc | ccagggggtg | 1440  |
|             | ctgtagccga | agaagtggtt   | gtcgttggta | gccccgctct | gacttgatat | ctgcttgtag | 1500  |
|             | aggtggttgt | tgtaggtggg   | cagggcccag | gtgcgggtgc | tggtggtgat | gactctgtcg | 1560  |
| 40          | cccagccatg | tggaatcgca   | atgccaattt | ccggaggcat | tacccactcc | gtcggcgcct | 1620  |
|             | tcgttattgt | ctgccattgg   | tgcgccaccg | cctgcagcca | ttgtaccaga | tcccagacct | 1680  |
|             | gagggcgcgg | cgggaggttc   | tccgagaggt | tgggggtcgg | gcactgacts | tgagtcgcca | 1740  |
| 45          | gtctgcccaa | agttgagctt   | ctttttagcg | ggctgctggc | ctttcttgcc | gatgcccgtg | 1800  |
|             | gaggagtcgg | gggattctat   | gggtetette | tttccaggag | ccgtcttagc | gccttcctca | 1860  |
|             | accagaccga | gaggttcgag   | aaccegette | ttggcctgga | agactgctcg | cccgaggttg | 1920  |
| 50          | ccccaaaag  | acgtatcttc   | ttgaagacgc | tcctgaaact | cagegtegge | gtggttgtac | 1980  |
|             | ttgaggtacg | ggttgtcccc   | ctgctcgagc | tgcttgtcgt | aggccttgtc | gtgctcgagg | 2040  |
|             | gccgcggcgt | ctgcctcgtt   | gaccggctct | cccttgtcga | gtccgttgaa | gggtccgagg | 2100  |
| 55          | tacttgtagc | caggaagcac   | cagaccccgg | ccgtcgtcct | gcttttgctg | gttggctttg | 2160  |

| ggtttegggg | ctccaggitt | caagtcccac | cactegegaa | cgeceteaga | gagginging | 2220 |
|------------|------------|------------|------------|------------|------------|------|
| tcgagccaat | ctggaagata | accatcggca | gccatacctg | gtttaagtca | tttattgctc | 2280 |
| agaaacacag | tcatccaggt | ccacgttgac | cagatogcag | gccgagcaag | caatctcggg | 2340 |
| agcccgcccc | agcagatgat | gaatggcaca | gagtttccga | tacgtcctct | ttctgacgac | 2400 |
| cggttgagat | tctgącacgc | cggggaaaca | ttctgaacag | tctctggtcc | cgtgcgtgaa | 2460 |
| gcaaatgttg | aaattctgat | tcattctctc | gcatgtcttg | cagggaaaca | gcatctgaag | 2520 |
| catgcccgcg | tgacgagaac | atttgttttg | gtacctgtcg | gcaaagtcca | ccggagctcc | 2580 |
| ttccgcgtct | gacgtcgatg | gateegegae | tgaggggcag | gcccgcttgg | gctcgctttt | 2640 |
| atccgcgtca | tcgggggcgg | gcctcttgtt | ggctccaccc | tttctgacgt | agaactcatg | 2700 |
| cgccacctcg | gtcacgtgat | cctgcgccca | gcggaagaac | tctttgactt | cctgctttgt | 2760 |
| caccttgcca | aagtcctgct | ccagacggcg | ggtgagttca | aatttgaaca | teeggtettg | 2820 |
| taacggctgc | tggtgctcga | aggtggtgct | gttcccgtca | atcacggcgc | acatgttggt | 2880 |
| gttggaagtg | acgatcacgg | gggtgggatc | gatctgggcg | gacgacttgc | acttttggtc | 2940 |
| cacgcgcacc | ttgctgccgc | cgagaatggc | cttggcggac | tccacgacct | tggccgtcat | 3000 |
| cttgccctcc | tcccaccaga | tcaccatctt | gtcgacgcaa | tcgttgaagg | gaaagttctc | 3060 |
| attggtccag | ttgacgcagc | cgtagaaagg | gcgaattc   |            |            | 3098 |

<210> 11

<211> 3121 <212> DNA

<213> new AAV serotype, clone 29.3

<400> 11

| gaattcgccc | ttcgcagaga | ccaaagttca | actgaaacga | atcaaccggt | ttattgatta | 60  |
|------------|------------|------------|------------|------------|------------|-----|
| acaagcaatt | acagattacg | ggtgaggtaa | cgggtgccga | tggggcgagg | ctcagaataa | 120 |
| gtgccatctg | tgttaacagc | aaagtccaca | tttgtagatt | tgtagtagtt | ggaagtgtat | 180 |
| tgaatctctg | ggttccagcg | tttgctgttt | tctttctgca | gctcccattc | aatttccacg | 240 |
| ctgacctgtc | cggtgctgta | ctgcgtgatg | aacgacgcca | gcttagcttg | actgaaggta | 300 |
| gttggaggat | ccgcgggaac | aggtgtattc | ttaatcagga | tctgaggagg | cgggtgtttc | 360 |
| agtccaaagc | cccccatcag | cggcgaggga | tgaaagtttc | cgtccgtgtg | aggaatcttg | 420 |
| gcccagatag | gaccctgcag | gtacacgtcc | cggttctgcc | agaccatgcc | aggtaaggct | 480 |
| ccttgactgt | tgacggcccc | tacaatagga | gcggcgtttt | gctgttgcag | gttatcggcc | 540 |
| accacgccgt | actgttctgt | ggccactggg | ttggtggttt | taatttcttc | ctcactggtt | 600 |
| agcataacgc | tgctatagtc | cacgttgcct | tttccagctc | cctgtttccc | aaacattaag | 660 |
| actccgctgg | acggaaaaaa | tegetetteg | togtocttgt | gggttgccat | agcgacaccg | 720 |
| ggatttacca | gagagtctct | gccattcaga | tgatacttgg | tggcaccggt | ccaggcaaag | 780 |

|           | ttgctgttg  | t tattttgcga | cagtgtcgt  | g gagacgcgt | t gctgccggt | a gcagggcccg | 840          |
|-----------|------------|--------------|------------|-------------|-------------|--------------|--------------|
|           |            |              |            |             |             | a aaatagcaac | 900          |
| 5         |            |              |            |             |             | a caggtactgg | 960          |
|           |            |              |            |             |             | gctgtgaaaa   | 1020         |
|           |            |              |            |             |             | r catttgagaa | 1080         |
| 10        |            |              |            |             |             | : attgttcaga | 1140         |
|           |            |              |            |             |             | caggcagccc   | 1200         |
|           |            | agccgaggac   |            |             |             |              | 1260         |
| 15        |            | ggttattggc   |            |             |             |              | 1320         |
|           |            | agagcttgaa   |            |             |             |              | 1380         |
| 20        |            | agtcacgtgg   |            |             |             |              | 1440         |
| 20        |            | tgtagccgaa   |            |             |             |              | 150 <b>0</b> |
|           |            | tgtagaggtg   |            |             |             |              | 156 <b>0</b> |
| 25        |            | tgtcgcccag   |            |             |             |              | 1620         |
| 25        |            | cgccttcgtt   |            |             |             |              | 1680         |
|           |            | gaccagaggg   |            |             |             |              | 1740         |
| 30        |            | cgccagtctg   |            |             |             |              | 1800         |
|           |            | ccgtagtgga   |            |             |             |              | 186 <b>0</b> |
|           |            | ccgtcttagc   |            |             |             |              | 1920         |
| <i>35</i> |            | agactgctcg   |            |             |             |              | 1980         |
|           | tcctgaaact | cggcgtcggc   | gtggtṭatac | cgcaggtacg  | gattgtcacc  | cgctttgagc   | 2040         |
|           | tgctggtcgt | aggccttgtc   | gtgctcgagg | gccgctgcgt  | ccgccgcgtt  | gacgggctcc   | 2100         |
| 40        | cccttgtcga | gtccgttgaa   | gggtccgagg | tacttgtagc  | caggaagcac  | cagaccccgg   | 2160         |
|           | ccgtcgtcct | gcttttgctg   | gttggctttg | ggcttcgggg  | ctccaggttt  | cagcgcccac   | 2220         |
|           | cactcgcgaa | tgccctcaga   | gaggttgtcc | tcgagccaat  | ctggaagata  | accatcggca   | 2280         |
| 45        | gccatacctg | atctaaatca   | tttattgttc | aaagatgcag  | tcatccaaat  | ccacattgac   | 2340         |
|           | cagatcgcag | gcagtgcaag   | cgtctggcac | ctttcccatg  | atatgatgaa  | tgtagcacag   | 2400         |
|           | tttctgatac | gcctttttga   | cgacagaaac | gggttgagat  | tctgacacgg  | gaaagcactc   | 2460         |
| 50        | taaacagtct | ttctgtccgt   | gagtgaagca | gatatttgaa  | ttctgattca  | ttctctcgca   | 2520         |
|           | ttgtctgcag | ggaaacagca   | tcagattcat | gcccacgtga  | cgagaacatt  | tgttttggta   | 2580         |
|           | cctgtccgcg | tagttgatcg . | aagcttccgc | gtctgacgtc  | gatggctgcg  | caactgactc   | 2640         |
| 55        | gcgcacccgt | ttgggctcac   | ttatatctgc | gtcactgggg  | gcgggtcttt  | tcttggctcc   | 270 <b>0</b> |
|           |            | •            |            |             |             |              |              |

|           | accettete                     | acgtagaatt       | catgctccac | ctcaaccacg | tgatectttg | cccaccggaa | 2760    |
|-----------|-------------------------------|------------------|------------|------------|------------|------------|---------|
| 5         | aaagtctttg                    | acttcctgct       | tggtgacctt | cccaaagtca | tgatccagac | ggcgggtgag | 2820    |
|           | ttcaaatttg                    | aacatccggt       | cttgcaacgg | ctgctggtgt | tcgaaggtcg | ttgagttccc | 2880    |
|           | gtcaatcacg                    | gcgcacatgt       | tggtgttgga | ggtgacgatc | acgggagtcg | ggtctatctg | 2940    |
| 10        | ggccgaggac                    | ttgcatttct       | ggtccacgcg | caccttgctt | cctccgagaa | tggctttggc | 3 0 0 0 |
|           | cgactccacg                    | accttggcgg       | tcatcttccc | ctcctcccac | cagatcacca | tcttgtcgac | 3060    |
|           | acagtegttg                    | aagggaaagt       | tctcattggt | ccagttgacg | cagccgtaga | agggcgaatt | 3120    |
| 15        | <b>c</b> .                    | -                |            |            |            |            | 3121    |
|           |                               |                  |            |            | • •        | •          |         |
|           | <210> 12                      |                  |            |            |            |            |         |
|           | <211> 3121                    |                  |            |            |            |            |         |
| 20        | <212> DNA<br><213> new AAV se | rotyne clone 29  | 4          |            |            |            |         |
|           |                               | otype, dione 25. | <b>-</b> 7 |            |            |            |         |
|           | <400> 12                      |                  |            |            |            |            |         |
| 25        |                               |                  |            | •          |            |            |         |
|           |                               |                  |            |            |            |            |         |
|           | :                             | ,                |            |            | •          |            |         |
|           |                               |                  | •          |            |            |            |         |
| 30        |                               |                  |            |            |            |            |         |
|           |                               |                  |            |            |            |            |         |
|           | •                             |                  |            |            |            |            |         |
| <i>35</i> |                               |                  |            |            |            |            |         |
|           | •                             |                  |            |            |            |            |         |
|           |                               |                  |            |            |            |            |         |
| 40        |                               |                  |            |            |            |            |         |
| 40        |                               |                  |            |            |            |            |         |
|           |                               |                  |            |            |            |            |         |
|           |                               |                  |            |            |            |            |         |
| 45        |                               |                  |            |            |            |            |         |
|           |                               |                  |            |            |            |            |         |
|           |                               |                  |            |            |            |            |         |
| 50        |                               |                  |            |            |            |            |         |
| 50        |                               |                  |            |            |            |            |         |
|           |                               |                  |            |            |            |            |         |

| gaattcgccc     | ttctacggct | gcgtcaactg | gaccaatgag | aactttccct | tcaacgactg | 60   |
|----------------|------------|------------|------------|------------|------------|------|
| tgtcgacaag     | atggtgatct | ggtgggagga | ggggaagatg | accgccaagg | tcgtggagtc | 120  |
| ggccaaagcc     | attctcggag | gaagcaaggt | gcgcgtggac | cagaaatgca | agtcctcggc | 180  |
| ccagatagac     | ccgactcccg | tgatcgtcac | ctccaacacc | aacatgtgcg | ccgtgattga | 240  |
| cgggaactca     | acgaccttcg | aacaccagca | gccgttgcaa | gaccggatgt | tcaaatttga | 300  |
| actcacccgc     | cgtctggatc | atgactttgg | gaaggtcacc | aagcaggaag | tcaaagactt | 360  |
| tttccggtgg     | gcaaaggatc | acgtggttga | ggtggagcac | gaattctacg | tcaaaaaggg | 420  |
| tggagccaag     | aaaagacccg | ccccagtga  | cgcagatata | agtgagccca | aacgggtgcg | 480  |
| cgagtcagtt     | gcgcagccat | cgacgtcaga | cgcggaagct | tcgatcaact | acgcagacag | 540  |
| gtaccaaaac     | aaatgttctc | gtcacgcggg | catgaatctg | atgctgtttc | cctgcagaca | 600  |
| atgcgagaga     | atgaatcaga | attcaaatat | ctgcttcact | cacggacaga | aagactgttt | 660  |
| agagtgcttt     | cccgtgtcag | aatctcaacc | cgtttctgtc | gtcaaaaagg | cgtatcagaa | 720  |
| actgtgctac     | attcatcata | tcatgggaaa | ggtgccagac | gcttgactg  | cotgcgatct | 780  |
| ggtcgatgtg     | gatttggatg | actgcatctt | tgaacaataa | atgatttaaa | tcaggtatgg | 840  |
| ctgccgatgg     | ttatcttcca | gattggctcg | aggacaacct | ctctgagggc | attcgcgagt | 900  |
| ggtgggcgct     | gaaacctgga | gccccgaagc | ccaaagccaa | ccagcaaaag | caggacggcg | 960  |
| gccggggtct     | ggtgcttcct | ggctacaagt | acctcggacc | cttcaacgga | ctcgacaagg | 1020 |
| <br>gggagcccgt | caacgcggcg | gacgcagcgg | ccctcgagca | cgacaaggcc | tacgaccagc | 1080 |
| agctcaaagc     | gggtgacaat | ccgtacctgc | ggtataacca | cgccgacgcc | gagtttcagg | 1140 |
| agcgtctgca     | agaagatacg | tcttttgggg | gcaacctcgg | gcgagcagtc | ttccaggcca | 1200 |

|     | agaagegggt tetegaacet eteggtetgg ttgaggaagg egetaagaeg geteetggaa | 1260 |
|-----|-------------------------------------------------------------------|------|
| _   | agaagagace ggtagagcea teaceceage gttetecaga etectetaeg ggcateggea | 1320 |
| 5   | agaaaggcca gcagcccgcg aaaaagagac tcaactttgg gcagactggc gactcagagt | 1380 |
|     | cagtgcccga cootcaacca atoggagaac cooccgcagg cooctotggt otgggatotg | 1440 |
|     | gtacaatggc tgcaggcggt ggcgctccaa tggcagacaa taacgaaggc gccgacggag | 1500 |
| 10  | tgggtagttc ctcaggaaat tggcattgcg attccacatg gctgggcgac tgagtcatca | 1560 |
|     | ccaccagcac ccgaacctgg gccctcccca cctacaacaa ccacctctac aagcaaatct | 1620 |
|     | ccaacgggac ttcgggagga agcaccaacg acaacaccta cttcggctac agcaccccct | 1680 |
| 15  | gggggtattt tgactttaac agattccact gccacttctc accacgtgac tggcagcgac | 1740 |
|     | tcatcaacaa caactgggga ttccggccca agagactcaa cttcaagctc ttcaacatcc | 1800 |
|     | aggtcaagga ggtcacgcag aatgaaggca ccaagaccat cgccaataac cttaccagca | 1860 |
| ·20 | cgattcaggt ctttacggac tcggaatacc agctcccgta cgtcctcggc tctgcgcacc | 1920 |
|     | agggetgeet geeteegtte eeggeggaeg tetteatgat teeteagtae gggtaeetga | 1980 |
| 05  | ctctgaacaa tggcagtcag gccgtgggcc gttcctcctt ctactgcctg gagtactttc | 2040 |
| 25  | cttctcaaat gctgagaacg ggcaacaact ttgagttcag ctaccagttt gaggacgtgc | 2100 |
|     | cttttcacag cagctacgcg cacagccaaa gcctggaccg gctgatgaac cccctcatcg | 2160 |
| 30  | accagtacct gtactacctg tctcggactc agtccacggg aggtaccgca ggaactcagc | 2220 |
| 30  | agttgctatt ttctcaggcc gggcctaata acatgtcggc tcaggccaaa aactggctac | 2280 |
|     | cogggeeetg ctaceggeag taacgegtet ceacgaeact gtegeaaaat aacaacagea | 2340 |
| 35  | actttgtctg gaccggtgcc accaagtatc atctgaatgg cagagactct ctggtagatc | 2400 |
| 50  | ccggtgtcgc tatggcaacc cacaaggacg acgaagagcg atttttccg tccagcggag  | 2460 |
|     | tcataatgtt tgggaaacag ggagctggaa aagacaacgt ggactatagc agcgtcatgc | 2520 |
| 40  | taaccagtga ggaagaatt aaaaccacca acccagtggc cacagaacag tacggcgtgg  | 2580 |
|     | tggccgataa cctgcaacag caaaacgccg ctcctattgt aggggccgtc aacagtcaag | 2640 |
|     | gageettace tggcatggte tggcagaace gggaegtgta cetgcagggt cetacetggg | 2700 |
| 45  | ccaagattcc tcacacggac ggaaactttc atccctcgcc gctgatggga ggctttggac | 2760 |
|     | tgaaacaccc gcctcctcag atcctgatta agaatacacc tgttcccgcg gatcctccaa | 2820 |
|     | ctaccttcag tcaagctaag ctggcgtcgt tcatcacgca gtacagcacc ggacaggtca | 2880 |
| 50  | gcgtggaaat tgaatgggag ctgcaggaag aaaacagcaa acgctggaac ccagagattc | 2940 |
| 30  | aatacacttc caactactac aaatctacaa atgtggactt tgctgttaac acagatggca | 3000 |
|     | cttattctga gcctcgcccc atcggcaccc gttacctcac ccgtaatctg taattgcttg | 3060 |
| 55  | ttaatcaata aaccggttga ttcgtttcag ttgaactttg gtctctgcga agggcgaatt | 3120 |
|     |                                                                   |      |

|    |                                                               | LF 1 310 3/1 B1 |   |      |
|----|---------------------------------------------------------------|-----------------|---|------|
|    | c                                                             |                 |   | 3121 |
| 5  | <210> 13                                                      |                 |   |      |
| •  | <211> 3121<br><212> DNA<br><213> new AAV serotype, clone 29.5 | <b>S</b>        |   |      |
| 10 | <400> 13                                                      |                 | · |      |
| 15 |                                                               |                 |   |      |
|    |                                                               |                 |   |      |
| 20 |                                                               | - •.            |   |      |
| 25 | <b>,</b>                                                      |                 |   |      |

35 . . .

|    | gaattcgccc | : ttcgcgagac | caaagttcaa | ctgaaacgaa | tcaaccggtt | tattgattaa | 60   |
|----|------------|--------------|------------|------------|------------|------------|------|
|    | caagcaatta | ı cagattacgg | gtgaggtaac | gggtgccgat | ggggcgaggc | tcagaataag | 120  |
| 5  | tgccatctgt | gttaacagca   | aagtccacat | ttgtagattt | gtagtagttg | gaagtgtatt | 180  |
|    | gaatctctgg | gttccagcgt   | ttgctgtttt | ctttctgcag | ctcccattca | atttccacgc | 240  |
|    | tgacctgtcc | ggtgctgtac   | tgcgtgatga | acgacgccag | cttagcttga | ctgaaggtag | 300  |
| 10 | ttggaggatc | cgcgggaaca   | ggtgtattct | taatcaggat | ctgaggaggc | gggtgtttca | 360  |
|    | gtccaaagcc | tcccatcagc   | ggcgagggat | gaaagtttcc | gtccgtgtga | ggaatcttgg | 420  |
|    | cccagatagg | accctgcagg   | tacacgtccc | ggttctgcca | gaccatgcca | ggtaaggctc | 48 C |
| 15 | cttgactgtt | gacggcccct   | acaataggag | cggcgttttg | ctgttgcagg | ttatcggcca | 540  |
|    | ccacgccgta | ctgttctgtg   | gccactgggt | tggtggtttt | aatttcttcc | tcactggtta | 600  |
|    | gcataacgct | gctatagtcc   | acgttgtctt | ttccagctcc | ctgtttccca | aacattaaga | 660  |
| 20 | ctccgctgga | cggaaaaaat   | cgctcttcgt | cgtccttgtg | ggttgccata | gcgacaccgg | 720  |
|    | gatttaccag | agagtctctg   | ccattcagat | gatacttggt | ggcaccggtc | caggcaaagt | 780  |
|    | tgctgttgtc | attttgcgac   | agtgtcgtgg | agacgcgttg | ctgccggtag | cagggcccgg | 840  |
| 25 | gtagccagtt | tttggcctga   | gccgacatgt | tattaggccc | ggcctgagaa | aatagcaact | 900  |
|    | gctgagttcc | tgcggtacct   | cccgtggact | gagtccgaga | caggtagtac | aggtactggt | 960  |
|    | cgatgagggg | gttcatcagc   | cggtccaggc | tttggctgtg | cgcgtagctg | ctgtgaaaag | 1020 |
| 30 | gcacgtcctc | aaactggtag   | ctgaactcaa | agttgttgcc | cgttctcagc | atttgagaag | 1080 |
|    | gaaagtactc | caggcagtag   | aaggaggaac | ggcccacggc | ctgactgcca | ttgttcagag | 1140 |
|    | tcaggtaccc | gtactgagga   | atcatgaaga | cgtccgccgg | gaacggaggc | aggcagccct | 1200 |
| 35 | ggtgcgcaga | gccgaggacg   | tacgggagct | ggtattccga | gtccgtaaag | acctgaatcg | 1260 |
|    | tgctggtaag | gttattggcg   | atggtcttgg | tgccttcatt | ctgcgtgacc | tccttgacct | 1320 |
|    | ggatgttgaa | gagcttgaag   | ttgaggctct | tgggccggaa | tccccagttg | ttgttgatga | 1380 |
| 40 | gtcgctgcca | gtcacgtggt   | gagaagtggc | agtggaatct | gttaaagtca | aaataccccc | 1440 |
|    | agggggtgct | gtagccgaag   | taggtgttgt | cgttggtgct | tcctcccgaa | gtcccgttgg | 1500 |
|    | agatttgctt | gtagaggtgg   | ttgttgtagg | tggggagggc | ccaggttcgg | gtgctggtgg | 1560 |
| 45 | tgatgactcc | gtcgcccagc   | catgtggaat | cgcaatgcca | atttcctgag | gaactaccca | 1620 |
|    | ctccgtcggc | gccttcgtta   | ttgtctgcca | ttggagcgcc | accgcctgca | gccattgtac | 1680 |

|      | cagatecea                                               | g accagagggg               | cctgcggggg | gttctccgat | tggttgaggg | tcgggcactg | 1740 |
|------|---------------------------------------------------------|----------------------------|------------|------------|------------|------------|------|
|      | actctgagto                                              | gccagtstgc                 | ccaaagttga | gtctctttt  | cgcgggctgd | tggcctttct | 1800 |
| 5    | tgccgatgcc                                              | cgtagaggag                 | tctggagaac | gctggggtga | tggctctacc | ggtotottot | 1860 |
|      | ttccaggago                                              | cgtcttagcg                 | ccttcctcaa | ccagaccgag | aggttcgaga | accegettet | 1920 |
|      | tggcctggaa<br>'                                         | a gact <sub>,</sub> gctcgc | ccgaggttgc | ccccaaaaga | cgtatcttct | tgcagacgct | 1980 |
| 10   | cctgaaactc                                              | ggcgtcggcg                 | tggttatacc | gcaggtacgg | attgtcaccc | gctttgagct | 2040 |
|      | gctggtcgta                                              | ggccttgtcg                 | tgctcgaggg | ccgctgcgtc | cgccgcgttg | acgggctccc | 2100 |
|      | ccttgtcgag                                              | tccgttgaag                 | ggtccgaggt | acttgtagcc | aggaagcacc | agaccccggc | 2160 |
| 15   | cgtcgtcctg                                              | cttttgctgg                 | ttggctttgg | gcttcggggc | tccaggtttc | agcgcccacc | 2220 |
|      | actcgcgaat                                              | gccctcagag                 | aggttgtcct | cgagccaatc | tggaagataa | ccatcggcag | 2280 |
|      | ccatacctga                                              | tttaaatcat                 | ttattgttca | aagatgcagt | catccaaatc | cacattgacc | 2340 |
| 20   | agategeagg                                              | cagtgcaagc                 | gtctggcacc | tttcccatga | tatgatgaat | gtagcacagt | 2400 |
|      | ttctgatacg                                              | cctttttgac                 | gacagaaacg | ggttgagatt | ctgacacggg | aaagcactct | 2460 |
| 25   | aaacagtctt                                              | tetgteegtg                 | agtgaagcag | atatttgaat | tctgattcat | tctctcgcat | 2520 |
| 25   | tgtctgcagg                                              | gaaacagcat                 | cagattcatg | cccacgtgac | gagaacattt | gttttggtac | 2580 |
|      | ctgtctgcgt                                              | agttgatcga                 | agcttccgcg | tctgacgtcg | atggctgcgc | aactgactcg | 2640 |
| 30 . | cgcacccgtt                                              | tgggctcact                 | tatatctgcg | tcactggggg | cgggtctttt | cttggctcca | 2700 |
|      | ccctttttga                                              | cgtagaattc                 | atgctccacc | tcaaccacgt | gatcctttgc | ccaccggaaa | 2760 |
|      | aagtctttga                                              | cttcctgctt                 | ggtgaccttc | ccaaagtcat | gatccagacg | gcgggtgagt | 2820 |
| 35   | tcaaatttga                                              | acatccggtc                 | ttgcaacggc | tgctggtgtt | cgaaggtcgt | tgagttcccg | 2880 |
|      | tcaatcacgg                                              | cgcacatgtt                 | ggtgttggag | gtgacgatca | cgggagtcgg | gtctatctgg | 2940 |
|      | gccgaggact                                              | tgcatttctg                 | gtccacgcgc | accttgcttc | ctccgagaat | ggctttggcc | 3000 |
| 10   | gactccacga                                              | ccttggcggt                 | catcttcccc | tecteccace | agatcaccat | cttgtcgaca | 3060 |
|      | cagtcgttga                                              | agggaaagtt                 | ctcattggtc | cagttgacgc | agccgtagaa | agggcgaatt | 3120 |
|      | c                                                       |                            |            |            |            |            | 3121 |
| 15   | <210> 14<br><211> 3131<br><212> DNA<br><213> new AAV se | erotype, cione 1-3         | 3          |            |            |            |      |
| 50   | <400> 14                                                | ••                         |            | •          |            |            |      |
|      |                                                         |                            |            |            |            |            |      |
|      | gcggccgcga                                              | attogocott                 | ggctgcgtca | actggaccaa | tgagaacttt | cccttcaatg | 60   |
| i5   | attgcgtcga                                              | caagatggtg                 | atctggtggg | aggagggcaa | gatgacggcc | aaggtcgtgg | 120  |
|      | agtccgccaa                                              | ggccattctc                 | qqcqqcaqca | aggtacacat | ggaccaaaa~ | tacaeatcat | 18.0 |

|           | ccgcccagat   | cgaccccacc | cccgtgatcg | tcacctccaa | caccaacat  | g tgcgccgtga | 240  |
|-----------|--------------|------------|------------|------------|------------|--------------|------|
| 5         | ttgacgggaa   | cagcaccacc | ttcgagcacc | agcagcctct | ccaggaccg  | g atgtttaagt | 300  |
| J         | tcgaactcac   | cegeegtetg | gagcacgact | ttggcaaggt | gacaaagcag | gaagtcaaag   | 360  |
|           | agttcttccg   | ctgggccagt | gatcacgtga | ccgaggtggc | gcatgagttt | tacgtcagaa   | 420  |
| 10        | agggcggagc   | cagcaaaaga | cccgcccccg | atgacgcgga | taaaagcgag | cccaagcggg   | 480  |
|           | cctgcccctc   | agtcgcggat | ccatcgacgt | cagacgcgga | aggageteeg | gtggactttg   | 540  |
|           | ccgacaggta   | ccaaaacaaa | tgttctcgtc | acgcgggcat | gcttcagatg | ctgtttccct   | 600  |
| 15        | gcaaaacgtg   | cgagagaatg | aatcggaatt | tcaacatttg | cttcacacac | ggggtcagag   | 660  |
|           | actgctcaga   | gtgtttcccc | ggcgtgtcag | aatctcaacc | ggtcgtcaga | aagaggacgt   | 720  |
|           | atcggaaact   | ccgtgcgatt | catcatctgc | tggggcgggc | tcccgagatt | gcttgctcgg   | 780  |
| 20        | cctgcgatct   | ggtcaacgtg | gacctggatg | actgtgtttc | tgagcaataa | atgacttaaa   | 840  |
|           | ccaggtatgg   | ctgccgatgg | ttatcttcca | gattggctcg | aggacaacct | ctctgagggc   | 900  |
|           | attcgcgagt   | ggtgggcgct | gaaacctgga | gccccgaagc | ccaaagccaa | ccagcaaaag   | 960  |
| 25        | caggacgacg   | gccggggtct | ggtgcttcct | ggctacaagt | acctcggacc | cttcaacgga   | 1020 |
|           | ctcgacaagg   | gggagcccgt | caacgcggcg | gacgcagcgg | ccctcgagca | cgacaaggct   | 1080 |
|           | tacgaccagc   | agctgcaggc | gggtgacaat | ccgtacctgc | ggtataacca | cgccgacgcc   | 1140 |
| 30        | gagtttcagg   | agcgtctgca | agaagatacg | tcttttgggg | gcaacctcgg | gcgagcagtc   | 1200 |
|           | ttccaggcca   | agaagcgggt | tctcgaacct | ctcggtctgg | ttgaggaagg | cgctaagacg   | 1260 |
|           | gctcctggaa   | agaagagacc | ggtagagcca | tcaccccagc | gttctccaga | ctcctctacg   | 1320 |
| <i>35</i> | ggcatcggca   | agaaaggcca | acagcccgcc | agaaaaagac | tcaattttgg | tcagactggc   | 1380 |
|           | gactcagagt   | cagttccaga | ccctcaacct | ctcggagaac | ctccagcagc | gccctctggt   | 1440 |
|           | gtgggaccta   | atacaatggc | tgcaggcggt | ggcgcaccaa | tggcagacaa | taacgaaggc   | 1500 |
| 40        | gccgacggag   | tgggtagttc | ctcgggaaat | tggcattgcg | attccacatg | gctgggcgac   | 1560 |
|           | agagtcatca   | ccaccagcac | ccgaacctgg | gccctgccca | cctacaacaa | ccacctctac   | 1620 |
|           | aagcaaatct   | ccaacgggac | atcgggagga | gccaccaacg | acaacaccta | cttcggctac   | 1680 |
| 45        | agcacccct    | gggggtattt | tgactttaac | agattccact | gccacctttc | accacgtgac   | 1740 |
|           | tggcagcgac   | tcatcaacaa | caactgggga | ttccgaccca | agagactcag | cttcaagctc   | 1800 |
|           | ttcaacatcc a | aggtcaagga | ggtcacgcag | aatgaaggca | ccaagaccat | cgccaataac   | 1860 |
| 50        | ctcaccagca o | ccatccaggt | gtttacggac | tcggagtacc | agctgccgta | cgttctcggc   | 1920 |
|           | tctgtccacc a | agggctgcct | gcctccgttc | ccggcggacg | tgttcatgat | tccccagtac   | 1980 |
|           | ggctacctaa   | cactcaacaa | cggtagtcag | gccgtgggac | gctcctcctt | ctactgcctg   | 2040 |
| 55        | gaatactttc d | cttcgcagat | gctgagaacc | ggcaacaact | tccagtttac | ttacaccttc   | 2100 |
|           |              |            |            |            |            |              |      |

|      | gaggacgtgc | ctttccacag | cagctacgcc | cacagctaga | gcttggaccg | gctgatgaat | 2160 |
|------|------------|------------|------------|------------|------------|------------|------|
| _    | cctctgattg | accagtacct | gtactacttg | tctcggactc | aaacaacagg | aggcacggca | 2220 |
| 5    | aatacgcaga | ctctgggctt | cagccaaggt | gggcctaata | caatggccaa | tcaggcaaag | 2280 |
|      | aactggctgc | caggaccctg | ttaccgccaa | caacgcgtct | caacgacaac | cgggcaaaac | 2340 |
|      | aacaatagca | actttgcctg | gactgctggg | accaaatacc | atctgaatgg | aagaaattca | 2400 |
| 10   | ttggctaatc | ctggcatcgc | tatggcaaca | cacaaagacg | acgaggagcg | tttttttccc | 2460 |
|      | agtaacggga | tcctgatttt | tggcaaacaa | aatgctgcca | gagacaatgc | ggattacagc | 2520 |
| . 15 | gatgtcatgc | tcaccagcga | ggaagaaatc | aaaaccacta | accctgtggc | tacagaggaa | 2580 |
| 15   | tacggtatcg | tggcagataa | cttgcagcag | caaaacacgg | ctcctcaaat | tggaactgtc | 2640 |
|      | aacagccagg | gggccttacc | cggtatggtc | tggcagaacc | gggacgtgta | cctgcagggt | 2700 |
| 20   | cccatctggg | ccaagattcc | tcacacggac | ggcaacttcc | accegtates | gctgatgggc | 2760 |
|      | ggctttggcc | tgaaacatcc | tccgcctcag | atcctgatca | agaacacgcc | tgtacctgcg | 2820 |
|      | gatcctccga | ccaccttcaa | ccagtcaaag | ctgaactctt | tcatcacgca | atacagcacc | 2880 |
| 25   | ggacaggtca | gcgtggaaat | tgaatgggag | ctgcagaagg | aaaacagcaa | gcgctggaac | 2940 |
| 25   | cccgagatcc | agtacacctc | caactactac | aaatctataa | gtgtggactt | tgctgttaat | 3000 |
|      | acagaaggcg | tgtactctga | accccgcccc | attggcaccc | gttacctcac | ccgtaatctg | 3060 |
| 30   | taattgcctg | ttaatcaata | aaccggttga | ttcgtttcag | ttgaactttg | gtctctgcga | 3120 |
|      | agggcgaatt | c          |            |            |            |            | 3131 |

<210> 15 35 <211> 3127 <212> DNA <213> new AAV serotype, clone 13-3b

<400> 15

40

45

50

55

| gcggccgcga | attogocott | cgcagagacc | aaagttcaac | tgaaacgaat | caaccggttt | 60  |
|------------|------------|------------|------------|------------|------------|-----|
| attgattaac | atgcaattac | agattacggg | tgaggtaacg | agtgccaata | gggcgaggct | 120 |
| cagagtaaac | accctggctg | tcaacggcaa | agtccacacc | agtctgcttt | tcaaagttgg | 180 |
| aggtgtactg | aatctccggg | tcccagcgct | tgctgttttc | cttctgcagc | toccactoga | 240 |
| tttccacgct | gacttgtccg | gtgctgtact | gtgtgatgaa | cgaagcaaac | ttggcaggag | 300 |
| taaacacctc | cggaggatta | gcgggaacgg | gagtgttctt | gatcaggatc | tgaggaggcg | 360 |
| gatgtttaag | tccaaagccg | cccatcaaag | gagacgggtg | aaagttgcca | tccgtgtgag | 420 |
| gaatcttggc | ccagatggga | ccctgcaggt | acacgtcccg | gttctgccag | accatgccag | 480 |
| gtaaggctcc | ctggttgttg | acaacttgtg | tctgggctgc | agtattagcc | gcttgtaagt | 540 |
| tgctgctgac | tatcccgtat | tettéegtgg | ctacaggatt | agtaggacga | atttcttctt | 600 |
| catttgtcat | taacacattt | tccaatgtag | ttttgttagt | tgctccagtt | tttccaaaaa | 660 |

|    | tcaggactco | gctggatgg  | g aaaaagcggt | cctcgtcgtc | cttgtgagtt | gccatggcga | 720  |
|----|------------|------------|--------------|------------|------------|------------|------|
| 5  | cgccgggatt | aaccaacgag | tttctgccgt   | tcaggtgate | tttggtggca | ccagtccaag | 780  |
|    | caaagttgct | gttgttgttt | tgatccagcg   | ttttggagad | cctttgttgc | cggaagcagg | 840  |
|    | gtccaggtaa | ccaattcttg | gcttgttcgg   | ccatagttga | aggcccgccc | tggtaaaact | 900  |
| 10 | gcagttcccg | attgccagct | gtgcctcctg   | ggtcactctg | tgttctggcc | aggtagtaca | 960  |
|    | agtactggtc | gatgaggga  | ttcatcagcc   | ggtccaggct | ctggctgtgt | gcgtagctgc | 1020 |
|    | tgtggaaagg | cacgtecteg | aagctgtagc   | tgaactcaaa | gttgttgccc | gttctcagca | 1080 |
| 15 | tctgagaggg | gaagtactcc | aggcagtaga   | aggaggaacg | teccacagae | tgactgccat | 1140 |
|    | tgttgagagt | caggtagccg | tactgaggaa   | tcatgaagac | gtccgccggg | aacggaggca | 1200 |
|    | ggcagccctg | gtgcgcagag | ccgaggacgt   | acggcagctg | gtattccgag | tccgagaata | 1260 |
| 20 | cctgaatcgt | gctggtaagg | ttattagcga   | tggtcgtaac | gccgtcattc | gtcgtgacct | 1320 |
|    | ccttgacctg | gatgttgaag | agcttgaacc   | gcagcttctt | gggccggaat | ccccagttgt | 1380 |
|    | tgttgatgag | tcgctgccag | tcacgtggtg   | agaagtggca | gtggaatctg | ttaaagtcaa | 1440 |
| 25 | aataccccca | gggggtgctg | tagccgaagt   | aggtgttgtc | gttggtacta | cctgcagttt | 1500 |
|    | cactggagat | ttgctcgtag | aggtggttgt   | tgtaggtggg | cagggcccag | gttcgggtgc | 1560 |
|    | tggtggtaat | gactctgtcg | cccagccatg   | tggaatcgca | atgccaattt | cctgaggcat | 1620 |
| 30 | tacccactcc | gtcggcacct | tcgttattgt   | ctgccattgg | tgcgccaccg | cctgcagcca | 1680 |
|    | ctgtaccaga | tcccacacta | gagggcgctg   | ctggaggttc | tccgagaggt | tgagggtcgg | 1740 |
|    | ggactgactc | tgagtcgcca | gtctgaccga   | aattgagtct | ctttctggcg | ggctgctggc | 1800 |
| 35 | ccttcttgcc | gatgcccgtg | gaggagtcgg   | gggaacgctg | aggtgacggc | tctaccggtc | 1860 |
|    | tcttctttgc | aggagccgtc | ttagcgcctt   | cctcaaccag | accgagaggt | tcgagaaccc | 1920 |
|    | gcttcttggc | ctggaagact | gctcgcccga   | ggttgcccc  | aaatgacgta | tcttcttgca | 1980 |
| 40 | gacgctcctg | aaactcggcg | tcggcgtggt   | tataccgcag | gtacgggttg | tcacccgcat | 2040 |
|    | tgagctgctg | gtcgtaggcc | ttgtcgtgct   | cgagggccgc | tgcgtccgcc | gcgttgacgg | 2100 |
|    | getecceett | gtcgagtccg | ttgaagggtc   | cgaggtactt | gtagccagga | agcaccagac | 2160 |
| 45 | cccggccgtt | gtcctgcttt | tgctggttgg   | ctttgggttt | cggggctcca | ggtttcaggt | 2220 |
|    | CCCACCACTC | gcgaatgccc | tcagagaggt   | tgtcctcgag | ccaatstgga | agataaccat | 2280 |
|    | cggcagccat | acctgattta | aatcatttat   | tgttcaaaga | tgcagtcatc | caaatccaca | 2340 |
| 50 | ttgaccagat | cgcaggcagt | gcaagcgtct   | ggcacctttc | ccatgatatg | atgaatgtag | 2400 |
|    | cacagtttct | gatacgcctt | tttgacgaca   | gaaacgggtt | tagattotga | cacgggaaag | 2460 |
|    | cactctaaac | agtctttctg | tccgtgagtg   | aagcagatat | ttgaattctg | attcattctc | 2520 |
| 55 | togcattgto | tgcagggaaa | cagcatcaga   | ttcatgccca | cgtgacgaga | acatttgttt | 2580 |

|    | tggtacctgt      | ctgcgtagtt        | gatcgaagct | teegegtetg | acgtcgatgg | ctgcgcaact | 2640 |
|----|-----------------|-------------------|------------|------------|------------|------------|------|
| 5  | gactcgcgca      | cccgtttggg        | ctcacttata | tctgcgtcac | tgggggcggg | tottttcttg | 2700 |
| •  | gctccaccct      | ttttgacgta        | gaattcatgc | tccacctcaa | ccacgtaatc | ctttgcccac | 2760 |
|    | cggaaaaagt      | ctttgacttc        | ctgcttggtg | accttcccaa | agtcatgatc | cagacggcgg | 2820 |
| 10 | ,<br>gtgagttcaa | atttgaacat        | ccggtcttgc | aacggctgct | ggtgttcgaa | ggtcgttgag | 2880 |
|    | ttcccgtcga      | tcacggcgca        | catgttggtg | ttggagatga | cgatcgcggg | agtcgggtct | 2940 |
|    | atctgggccg      | aggacttgca        | tttctggtcc | acgcgcacct | tgcttcctcc | gagaatggct | 3000 |
| 15 | ttggccgact      | ccacgacett        | ggcggtcatc | ttcccctcct | cccaccagat | caccatcttg | 3060 |
|    | tcgacacagt      | cgttgaaggg        | aaagttctca | ttggtccagt | tgacgcagcc | gtagaaaggg | 3120 |
|    | cgaattc         |                   |            |            |            |            | 3127 |
| 20 |                 |                   |            |            |            |            |      |
|    | <210> 16        |                   |            |            |            |            |      |
|    | <211> 3106      |                   |            |            |            |            |      |
|    | <212> DNA       |                   |            |            |            |            |      |
|    | <213> new AAV   | serotype, clone 2 | 24-1       |            |            |            |      |
| 25 |                 | '                 |            | •          |            | <b>.</b>   |      |
|    | <400> 16        |                   |            |            |            |            |      |

· 15

| gcggccgcga | attcgccctt | cgcagagacc | aaagttcaac | tgaaacgaat  | caaccggttt | 60   |
|------------|------------|------------|------------|-------------|------------|------|
| attgattaac | aagtaattac | aggttacggg | tgaggtaacg | ggtgccaatg  | gggcgaggct | 120  |
| cagtataaac | cccttcgttg | ttgacagcaa | attccacatt | attagacttg  | gcataatttg | 180  |
| aggtgtactg | aatctctgga | ttccagcgtt | tgctgttttc | tttctgcagt  | tcccactcga | 240  |
| tctccacgct | gacctggccg | gtgctgtact | gcgtgataaa | tgaggcaaac  | ttggcaggag | 300  |
| taaacacctc | tggaggatta | gcaggtaccg | gggtgttttt | gatgagaatt  | tgaggaggcg | 360  |
| ggtgtttgag | tccaaatccg | cccatcaggg | gagacgggtg | aaagttgccg  | tccgtgtgag | 420  |
| gaattttggc | ccagatggga | ccctgcaggc | acacgtcccg | gttctgccag  | accatgccgg | 480  |
| gcagagcccc | ctggctgttg | acagtctgtg | tctggggtcc | ggccgtagac  | gattgcaggt | 540  |
| tgctggagac | cacaccgtat | tottotgtag | ccacgggatt | ggtggttttg  | atctcctcct | 600  |
| cgctggtcat | tagcacgttt | tccagcgttg | tcttgttggc | agcccccgtt  | ttgccaaaaa | 660  |
| ccagcactcc | gttgatggga | aagaactggt | cctcgtcgtc | cttgttggtg  | gccatggcta | 720  |
| cgcccgggtt | ggttaatgaa | tttctaccat | tcagatggta | tttagtggcc  | ccggtccagg | 780  |
| caaagttact | gttgttgttg | ctgtctatgt | tttttgacag | tctctgctgc  | cgataacagg | 840  |
| gtccgggcag | ccagttcttt | gattgctcgg | ccatggtgtt | gggcccagcc  | tgatggaact | 900  |
| gcagetecet | tgtggacccc | gtagtgctct | gggtccgggc | caggtagtac, | aggtactggt | 960  |
| cgatgagggg | attcatcagc | cggtctaggc | tctggctgtg | cacatagetg  | ctgtggaaag | 1020 |
| gcacttcctc | aaaggtgtag | ctgaattcaa | agttattgcc | catteteage  | atctmamaam | 1080 |

|            | gaaagtacto   | caggcagtag | g aaggaggaa | c gtcccacag | a ctgactgcc  | g ttgtttagag | 1140 |
|------------|--------------|------------|-------------|-------------|--------------|--------------|------|
| 5          | tcagatatco   | gtactgagga | atcatgaac   | a cgtccgcag | g gaacggagg  | g aggcagccct | 1200 |
| J          | ggtgcgcaga   | gccgaggacg | tacggcagt   | t ggtactccg | a gtccgagaa  | acctgaatcg   | 1260 |
|            | tgctggtaag   | gttattagcg | atggtcgta   | a cgccgtcgt | t cgtcgtgacc | teettgacet   | 1320 |
| 10         | ggatgttgaa   | caacttgaac | cgcagcttt   | tgggccgga   | a tececagttg | , ttgttgatga | 1380 |
|            | gtcgctgcca   | gtcacgtggt | gagaagtgg   | agtggaatc   | gttgaagtca   | aaatagcccc   | 1440 |
|            | agggggtgct   | gtagctgaag | aagtggttgt  | cgttggtag   | cccgctctga   | cttgatatct   | 1500 |
| 15         | gcttgtagag   | gtggttgttg | taggtgggc   | gggcccaggt  | gegggtgetg   | gtggtgatga   | 1560 |
|            | ctctgtcgcc   | cagccatgtg | gaatcgcaat  | gccaatttc   | ggaggcatta   | cccactccgt   | 1620 |
|            | cggcgccttc   | gttattgtct | gccattggtg  | cgccaccgcd  | tgcagccatt   | gtaccagatc   | 1680 |
| 20         | ccagacctga   | gggcgcggcg | ggaggttctc  | cgagaggttg  | ggggtcgggc   | actgactctg   | 1740 |
|            | agtcgccagt   | ctgcccaaag | ttgagcttct  | ttttagcggg  | ctgctggcct   | ttcttgccga   | 1800 |
|            | tgcccgtgga   | ggagtcgggg | gattctatgg  | gtatattatt  | tccaggagcc   | gtcttagcga   | 1860 |
| 25         | cttcctcaac   | cagaccgaga | ggttcgagaa  | cccgcttctt  | ggcctggaag   | actgctcgcc   | 1920 |
|            | cgaggttgcc   | cccaaaagac | gtatcttctt  | gaagacgctc  | ctgaaactcg   | gcgtcggcgt   | 1980 |
|            | ggttgtactt   | gaggtacggg | ttgtccccct  | gctcgagctg  | cttgtcgtag   | gccttgtcgt   | 2040 |
| 30         | gctcgagggc   | cgcggcgtct | gcctcgttga  | ccggctctcc  | cttgtcgagt   | ccgttgaagg   | 2100 |
|            | gtctgaggta   | cttgtagcca | ggaagcacca  | gaccccggcc  | gtcgtcctgc   | ttttgctggt   | 2160 |
|            |              |            |             |             | ctcgcgaatg   |              | 2220 |
| <b>3</b> 5 |              |            |             |             | catacctggt   |              | 2280 |
|            |              |            |             |             | gatcgcaggc   |              | 2340 |
|            |              |            |             |             | gtttccgata   |              | 2400 |
| 40         | ctgacgaccg   | gttgagattc | tgacacgccg  | gggaaacatt  | ctgaacagtc   | tctggtcccg   | 2460 |
|            | tgcgtgaagc   | aaatgttgaa | attctgattc  | actototogo  | atgtcttgca   | gggaaacagc   | 2520 |
|            | atctgaagca   | tgcccgcgtg | acgagaacat  | ttgttttggt  | acctgtcggc   | aaagtccacc   | 2580 |
| 45         | ggageteett   | ccgcgtctga | cgtcgatgga  | ttcgcgactg  | aggggcaggc   | ccgcttgggc   | 2640 |
|            | tegettttat   | ccgcgtcatc | gggggcgggt  | ctcttgttgg  | cccaccctt    | tctgacgtag   | 2700 |
|            | aacccatgcg   | ccacctcggt | cacgtgatcc  | tgcgcccagc  | ggaagaacct   | tttgacttcc   | 2760 |
| 50         | tgctttgtca   | ccttgccaaa | gttatgctcc  | agacggcggg  | tgggttcaaa   | tttgaacatc   | 2820 |
|            | cggtcctgca   | acggctgctg | gtgctcgaag  | gtggcgctgt  | tcccgtcaat   | cacggcgcac   | 2880 |
|            | atgttggtgt   | tggaggtgac | ggtcacgggg  | gtggggtcga  | tctgggcgga   | cgacttgcac   | 2940 |
| 55         | ttttggtcca ( | cgcgcacctt | gctgccgccg  | agaatggcct  | tggcggactc   | cacgaccttg   | 3000 |
|            |              |            | •           |             |              |              |      |

|    |                                                        |                   |            |            |        | gttgaaggga | 3060 |
|----|--------------------------------------------------------|-------------------|------------|------------|--------|------------|------|
| 5  | aagttctcat                                             | tggtccagtt        | gacgcagccg | tagaaagggc | gaattc |            | 3106 |
| 3  |                                                        |                   |            |            |        |            |      |
| 10 | <210> 17<br><211> 3102<br><212> DNA<br><213> new AAV s | serotype, clone 2 | 27-3       | ,          |        |            |      |
|    | <400> 17                                               |                   |            |            |        |            |      |
| 15 |                                                        | ÷                 |            |            |        |            |      |
|    |                                                        |                   |            |            |        |            |      |
|    |                                                        |                   |            |            |        |            |      |
| 20 |                                                        |                   |            |            |        |            |      |
|    |                                                        |                   |            |            |        |            |      |
| 25 |                                                        |                   |            |            |        |            |      |
| 25 |                                                        |                   |            |            |        |            |      |
|    |                                                        |                   |            |            |        |            |      |
| 30 |                                                        | •                 |            |            |        |            |      |
|    |                                                        |                   |            |            |        |            |      |
|    |                                                        |                   |            |            |        |            |      |
| 35 |                                                        |                   |            |            |        |            |      |
|    |                                                        |                   |            |            | • ,    | . •        |      |
| 40 |                                                        |                   |            |            |        |            |      |
|    |                                                        |                   |            |            |        |            |      |
|    |                                                        |                   |            |            |        |            |      |
| 45 |                                                        |                   |            |            |        |            |      |

|    | gcggccgcg  | a attogocott | cgcagagac   | aaagttcaa   | tgaaacgaat   | caaccggttt | 60   |
|----|------------|--------------|-------------|-------------|--------------|------------|------|
|    | attgattaa  | c aagtaattad | aggttacgg   | g tgaggtaac | g ggtgccaatg | gggcgaggct | 120  |
| 5  | cagtataaa  | c cccttcgttc | ; ttgacagca | attccacatt  | attagacttg   | gcataatttg | 180  |
|    | aggtgtact  | g aatctctgge | ttccagcgtt  | tgctgtttt   | tttctgcagt   | teccactega | 240  |
|    | tctccacgct | gacctggccg   | gtgctgtact  | gcgtgataaa  | tgaggcaaac   | ttggcaggag | 300  |
| 10 | taaacaccto | tggaggatta   | gcaggtaccg  | gggtgtttt   | gatgagaatt   | tgaggaggcg | 360  |
|    | ggtgtttgag | , tccaaatccg | cccatcaggg  | gagacgggtg  | aaagttgccg   | tccgtgtgag | 420  |
|    | gaatttcggc | ccagatggga   | ccctgcaggt  | acacgtcccg  | gttctgccag   | accatgccgg | 480  |
| 15 | gcagagcccc | : ctggctgttg | acagtetgtg  | teeggggtee  | ggccgtagac   | gattgcaggt | 540  |
|    | tgctggagac | : cacaccgtat | tcttctgtag  | ccacgggatt  | ggtggttttg   | atctcctcct | 600  |
|    | cgctggtcat | tagcacgttt   | tccagcgttg  | tcttgttggc  | agcccccgtt   | ttgccaaaaa | 660  |
| 20 | ccagcactcc | gttgatggga   | aggaactggt  | cctcgtcgtc  | cttgttggtg   | gccatggcta | 720  |
|    | egecegggtt | ggttaatgaa   | tttctaccat  | tcagatggta  | tttagtggcc   | ccggtccagg | 780  |
|    | caaagttact | gttgttgttg   | ctgtctatgt  | tttttgacag  | tctctgctgc   | cgataacagg | 840  |
| 25 | gtccgggcag | ccagttcttt   | gattgctcgg  | ccacggtgtt  | gggcccagcc   | tgatggaact | 900  |
|    | gcagctccct | tgtggacccc   | gtagtgctct  | gggtccgggc  | caggtagtac   | aggtactggt | 960  |
|    | cgatgagggg | attcatcagc   | cggtccaggc  | tctggctgtg  | cgcatagctg   | ctgtggaaag | 1020 |
| 30 | gcacttcctc | aaaggtgtag   | ctgaattcaa  | agttattgcc  | cgttctcagc   | atctgagaag | 1080 |
|    | gaaagtactc | caggcagcag   | aaggaggaac  | gtcccacaga  | ctgactgccg   | ttgtttagag | 1140 |
|    | tcagatatcc | gtactgagga   | atcatgaaca  | cgtccgcagg  | gaacggaggg   | aggcagccct | 1200 |
| 35 | ggtgcgcaga | gccgaggacg   | tacggcagtt  | ggtactccga  | gtccgagaag   | acctgaatcg | 1260 |
|    | tgctggtaag | gttattagcg   | atggtcgtaa  | cgccgtcgtt  | cgtcgtgacc   | tccttgacct | 1320 |
|    | ggatgttģaa | caacttgaac   | cgcagctttc  | tgggccggaa  | tccccagttg   | ttgttgatga | 1380 |
| 40 | gtcgctgcca | gtcacgtggt   | gagaagtggc  | agtggaatct  | gttgaagtca   | aaatagcccc | 1440 |
|    | agggggtgct | gtagccgaag   | aagtggttgt  | cgttggtagc  | cccgctctga   | cttgatatct | 1500 |
|    | gcttgtagag | gtggttgttg   | taggtgggca  | gggcccaggt  | gcgggtgctg   | gtggtgatga | 1560 |
| 45 | statatoace | carccatoto   | «Batcacant  | 55555FF55   |              |            |      |

cggcgccttc gttattgtct gccartggtg cgccaccgcc tgcagccatt gtaccagatc

|           | ccagacctga                     | gggcgcggcg        | ggaggttctc  | cgagaggttg  | ggggtcgggc  | actgactctg | 1740          |
|-----------|--------------------------------|-------------------|-------------|-------------|-------------|------------|---------------|
| 5         | agtcgccagt                     | ctgcccaaag        | ttgagcttct  | ttttagcggg  | ctgctggcct  | ttcttgccga | 1800          |
|           | tgcccgtgga                     | ggagtcgggg        | gattctatgg  | gtctcttctt  | tccggaagcc  | gtcttagcgc | 1860          |
|           | cttcctcaac                     | cagaccgaga        | ggttcgagaa  | cccgcttctt  | ggcctggaag  | actgctcgcc | 1920          |
| 10        | cgaggttgcc                     | cccaaaagac        | gtatcttctt  | gaagacgctc  | ctgaaactcg  | gcgtcggcgt | 1980          |
|           | ggttgtactt                     | gaggtacggg        | ttgtccccct  | gctcgagctg  | cttgtcgtag  | gccttgtcgt | 2040          |
| 4.5       | gctcgagggc                     | cgcggcgtct        | gcctcgttga  | ccggctctcc  | cttgtcgagt  | ccgttgaagg | 2100          |
| <b>15</b> | gtccgaggta                     | cttgtagcca        | ggaagcacca  | gaccccggcc  | gtegteetge  | ttttgctggt | 2160          |
|           | tggctttggg                     | tttcggggct        | ccaggtttca  | agtcccacca  | ctcgcgaatg  | ccctcagaga | 2220          |
| 20        | ggttgtcctc                     | gagccaatct        | ggaagataac  | catcggcagc  | catacctggt  | ttaagtcatt | 2280          |
| 20        | tattgctcag                     | aaacacagtc        | atccaggtcc  | acgttgacca  | gatcgcaggc  | cgagcaagca | 2340          |
|           | atctcgggag                     | cccgccccag        | cagatgatga  | atggcacaga  | gtttccgata  | cgtcctcttt | 2400          |
| 25        | ctgacgaccg                     | gttgagattc        | tgacacgccg  | gggaaacatt  | ctgaacagtc  | tctggtcccg | 2460          |
| 25        | tgcgtgaagc                     | aaatgttgaa        | attctgattc  | attctctcgc  | atgtcttgca  | gggaaacagc | 2520          |
|           | atctgaagca                     | tgcccgcgtg        | acgagaacat  | ttgttttggt  | acctgtcggc  | aaagtccacc | 2580          |
| 30        | ggagctcctt                     | ccgcgtctga        | cgtcgatgga  | tccgcgactg  | aggggcaagc  | ccgcttgggc | 2640          |
| 30        | tegettttat                     | ccgcgtcatc        | gggggcgggt  | ctcttgttgg  | ctccaccctt  | tctgacgtag | 2 <b>70</b> 0 |
|           | aactcatgcg                     | ccacctcggt        | cacgtgatcc  | tgcgcccagc  | ggaagaactc  | tttgacttcc | 2760          |
| 35        | tgctttgtca                     | ccttgccaaa        | gtcatgctcc  | agacggcggg  | tgagttcaaa  | tttgaacatc | 2820          |
| 55        | cggtcttgta                     | acggctgctg        | gtgctcgaag  | gtggtgctgt  | tcccgtcaat  | cacggcgcac | 2880          |
|           | atgttggtgt                     | tggaagtgac        | gatcacgggg  | gtgggatcga  | tctgggcgga  | cgacttgcac | 2940          |
| 40        | ttttggtcca                     | cgcgcacctt        | gctgccgccg  | agaatggcct  | tggcggactc  | cacgaccttg | 3000          |
|           | gccgtcatct                     | tgccctcctc        | ccaccagatc  | accatcttgt  | cgacgcaatc  | gttgaaggga | 3060          |
|           | aagttctcat                     | tggtccagtt        | gacgcagccg  | aagggcgaat  | tc          |            | 3102          |
| 45        | <210> 18                       |                   |             |             |             |            |               |
|           | <211> 3106                     |                   |             | •           |             | •          |               |
|           | <212> DNA<br><213> new AAV ser | otyne clone 7-2   |             |             |             |            |               |
| <b>50</b> |                                | 0.390, 0.07.0 1 2 |             | •           |             |            |               |
| 50        | <400> 18                       |                   |             |             |             |            |               |
|           | deddeededw wi                  | ttegecett c       | gcagagacc a | aagttcaac t | gaaacgaat c | agccggttt  | 60            |
| 55        | attgattaac a                   | agtaattac a       | ggttacggg t | gaggtaacg g | gtgccaatg g | ggcgaggct  | 120           |
|           | cagtataaac c                   | ccttcgttg t       | tgacagcaa a | ttccacatt a | ttagacttg g | cataatttg  | 180           |

|    | aggtgtactg aatctctgga ttccagcgtt tgctgttttc tttctgcagt tcccactcga | 240  |
|----|-------------------------------------------------------------------|------|
| •  | tetecaeget gacetggeeg gtgetgtaet gegtgataaa tgaggeaaae ttggeaggag | 300  |
| 5  | taaacacctc tggaggatta gcaggtaccg gggtgttttt gatgagaatt tgaggaggcg | 360  |
|    | ggtgtttgag tocaaatoog cocatoaggg gagaogggtg aaagttgoog toogtgtgag | 420  |
| 10 | gaattttggc ccagatggga ccctgcaggt acacgtcccg gttctgccag accatgccgg | 480  |
| 10 | gcagagcccc ctggctgttg acagtctgtg tctggggtcc ggccgtagac gattgcaggt | 540  |
|    | tgctggagac cacaccgtat tottotgtag coacgggatt ggtggttttg atotoctoot | 600  |
| 15 | egetggteat tageacgttt tecagegttg tettgttgge ageceeegtt ttgccaaaaa | 660  |
| 15 | ccagcactcc gttgatggga aagaactggt cctcgtcgtc ettgttggtg gccatggcta | 720  |
|    | cgcccgggtt ggttaatgaa tttctaccat tcagatggta tttagtggcc ccggtccagg | 780  |
| 20 | caaagttact gttgttgttg ctgtctatgt tttttgacag tctctgctgc cgataacagg | 840  |
| 20 | gtccgggcag ccagttcttt gattgctcgg ccatggtgtt gggcccagcc tgatggaact | 900  |
|    | gcagetecet tgtggacece gtagtgetet gggteeggge caggtagtae aggtaetggt | 960  |
| 25 | cgatgagggg attcatcagc cggtccaggc tctggctgtg cgcatagctg ctgtggaaag | 1020 |
|    | gcacttcctc aaaggtgtag ctgaattcaa agttatcgcc cgttctcagc atctgagaag | 1080 |
|    | gaaagtactc caggcagtag aaggaggaac gtcccacaga ctgactgccg ttgtttagag | 1140 |
| 30 | tcagatatcc gtactgagga atcatgaaca cgtccgcagg gaacggaggg aggcagccct | 1200 |
|    | ggtgcgcaga gccgaggacg tacggcagtt ggtactccga gtccgagaag acctgaatcg | 1260 |
|    | tgctggtaag gttattagcg atggtcgtaa cgccgtcgtt cgtcgtgacc tccttgacct | 1320 |
| 35 | ggatgttgaa caacttgaac cgcagctttc tgggccggaa tccccagttg ttgttgatga | 1380 |
|    | gtcgctgcca gtcacgtggt gagaagtggc agtggaatct gttgaagtca aaatagcccc | 1440 |
|    | agggggtgct gtagccgaag aagtggttgt cgttggtagc cccgctctga cttgatatct | 1500 |
| 40 | gettgtagag gtggttgttg taggtgggca gggcccaggt gegggtgetg gtggtgatga | 1560 |
|    | ctctgtcgcc cagccatgtg gaatcgcaat gccaatttcc ggaggcatta cccactccgt | 1620 |
|    | eggegeette gttattgtet gecattggtg egecacegee tgeageeatt gtaccagate | 1680 |
| 45 | ccagacctga gggcgcggcg ggaggttctc cgagaggttg ggggtcgggc actgactctg | 1740 |
|    | agtogocagt otgoccaaag ttgagottot ttttagoggg oggotggoog ttottgooga | 1800 |
| •  | tgcccgtgga ggagtcgggg gattctatgg gtctcttctt tccaggagcc gtcttagcgc | 1860 |
| 50 | cttcctcaac cagaccgaga ggttcgagaa cccgcttctt ggcctggaag actgctcgcc | 1920 |
|    | cgaggttgcc cccaaaagac gtatcttctt gaagacgctc ctgaaactcg gcgtcggcgt | 1980 |
|    | ggttgtactt gaggtacggg ttgtccccct gctcgagctg cttgtcgtag gccttgtcgt | 2040 |
| 55 | gctcgagggc cgcggcgtct gcctcgttga ccggctctcc cttgtcgagt ccgttgaagg | 2100 |

|   | gtccgaggta | cctgtagcca | ggaagcacca  | gaccccggcc | gtcgtcctgc | ttttgctggt | 2160 |
|---|------------|------------|-------------|------------|------------|------------|------|
|   | tggctttggg | tttcggggct | ccaggtttca  | agtoccacca | ctcgcgaatg | ccctcagaga | 2220 |
|   | ggttgccctc | gagccaatct | ggaagataac  | catcggcagc | catacctggt | ttaagtcatt | 2280 |
|   | tattgctcag | aaacacagtc | atccaggtcc  | acgttggcca | gatcgcaggc | cgagcaagca | 2340 |
|   | atctcgggag | cccgccccag | cagatgatga  | atggcacaga | gtttccgata | cgtcctcttt | 2400 |
|   | ctgacgaccg | gttgagattc | tgacacgccg  | gggaaacatt | ctgaacagtc | tetggteeeg | 2460 |
|   | tgcgtgaagc | aaatgttgaa | attctgattc. | attctctcgc | atgtcttgca | ggggaacagc | 2520 |
| , | atctgaagca | tgcccgcgtg | acgagaacat  | ttgttttggt | acctgtcggc | aaagtccacc | 2580 |
| 1 | ggagctcctt | ccgcgtctga | cgtcgatgga  | tccgcgactg | aggggcaggc | ccgcttgggc | 2640 |
| • | tcgcttttat | ccgcgtcatc | gggggcgggt  | ctcttgttgg | ctccaccctt | tctgacgtag | 2700 |
| • | aactcatacg | ccacctcggt | cacgtgatcc  | tgcgcccagc | ggaagaactc | tttgacttcc | 2760 |
| 1 | tgctttgtca | ccttgccaaa | gtcatgctcc  | agacggcggg | tgagttcaaa | tttgaacatc | 2820 |
| ( | eggtettgta | acggctgctg | gtgctcgaag  | gtggtgctgt | tcccgtcaat | cacggcgcac | 2880 |
| ĕ | atgttggtgt | tggaagtgac | gatcacgggg  | gtgggatcga | tctgggcgga | cgacttgcac | 2940 |
| t | tttggtcca  | cgcgcacctt | gctgccgccg  | agaatggcct | tggcggactc | cacgaccttg | 3000 |
| ç | gccgtcatcc | tgccctcctc | ccaccagatc  | accatcttgt | cgacgcaatc | gttgaaggga | 3060 |
| ē | agttctcat  | tggtccagtt | gacgcagccg  | tagaaagggc | gaatto     |            | 3106 |

<210> 19 <211> 3105 <212> DNA <213> new AAV serotype, clone C1

<400> 19

. 20

| gaattcgccc | ttgctgcgtc  | aactggacca | atgagaactt | tcccttcaac | gattgcgtcg | 60  |
|------------|-------------|------------|------------|------------|------------|-----|
| acaagatggt | gatctggtgg  | gaggaggca  | agatgaccgc | caaggtcgtg | gagtccgcca | 120 |
| aggccattct | gggcggaagc  | aaggtgcgcg | tggaccaaaa | gtgcaagtca | tcggcccaga | 180 |
| togaccccac | gcccgtgatc  | gtcacctcca | acaccaacat | gtgcgccgtg | atcgacggga | 240 |
| acagcaccac | cttcgagcac  | cagcagccgc | tgcaggaccg | catgttcaag | ttcgagctca | 300 |
| cccgccgtct | ggagcacgac  | tttggcaagg | tgaccaagca | ggaagtcaaa | gagttcttcc | 360 |
| gctgggctca | ggatcacgtg  | actgaggtgg | cgcatgagtt | ctacgtcaga | aagggcggag | 420 |
| ccaccaaaag | acccgccccc  | agtgacgcgg | atataagcga | gcccaagcgg | gcctgcccct | 480 |
| cagttgcgga | gccatcgacg. | tcagacgcgg | aagcaccggt | ggactttgcg | gacaggtacc | 540 |
| aaaacaaatg | ttctcgtcac  | gcgggcatgc | ttcagatgct | gtttccctgc | aagacatgcg | 600 |
| agagaatgaa | tcagaatttc  | aacgtctgct | tcacgcacgg | ggtcagagac | tgctcagagt | 660 |
| gcttccccgg | cgcgtcagaa  | tctcaacccg | tcgtcagaaa | aaagacgtat | cagaaactgt | 720 |

|    | gcgcgattca | tcatctgctg | gggcgggcac   | ccgagattgc | gtgttcggcc | cgcgatctcg | 780  |
|----|------------|------------|--------------|------------|------------|------------|------|
|    | tcaacgtgga | cttggatgac | : tgtgtttctg | agcaataaat | gacttaaacc | aggtatggct | 840  |
| 5  | gctgacggtt | atcttccaga | ttggctcgag   | gacaacctct | ctgagggcat | tcgcgagtgg | 900  |
|    | tgggacctga | aacctggagc | ccccaagccc   | aaggccaacc | agcagaagca | ggacgacggc | 960  |
|    | cggggtctgg | tgcttcctgg | ctacaagtac   | ctcggaccct | tcaacggact | cgacaagggg | 1020 |
| 10 | gagcccgtca | acgcggcgga | cgcagcggcc   | ctcgagcacg | acaaggccta | cgaccagcag | 1080 |
|    | ctcaaagcgg | gtgacaatcc | gtacctgcgg   | tataaccacg | ccgacgccga | gtttcaggag | 1140 |
| 45 | cgtctgcaag | aagatacgtc | ttttgggggc   | aacctcgggc | gagcagtctt | ccaggccaag | 1200 |
| 15 | aagagggtac | tcgaacctct | gggcctggtt   | gaagaaggtg | ctaagacggc | tcctggaaag | 1260 |
|    | aagagaccgt | tagagtcacc | acaagagccc   | gactcctcct | caggaatcgg | caaaaaaggc | 1320 |
| 20 | aaacaaccag | ccaaaaagag | actcaacttt   | gaagaggaca | ctggagccgg | agacggaccc | 1380 |
| 20 | cctgaaggat | cagataccag | cgccatgtct   | tcagacattg | aaatgcgtgc | agcaccgggc | 1440 |
|    | ggaaatgctg | tcgatgcggg | acaaggttcc   | gatggagtgg | gtaatgcctc | gggtgattgg | 1500 |
| 25 | cattgcgatt | ccacctggtc | tgagggcaag   | gtcacaacaa | cctcgaccag | aacctgggtc | 1560 |
|    | ttgcccacct | acaacaacca | cttgtacctg   | cggctcggaa | caacatcaaa | cagcaacacc | 1620 |
|    | tacaacggat | tctccacccc | ctggggatac   | tttgacttta | acagattcca | ctgtcacttc | 1680 |
| 30 | tcaccacgtg | actggcaaag | actcatcaac   | aacaactggg | gactacgacc | aaaagccatg | 1740 |
|    | cgcgttaaaa | tcttcaatat | ccaagttaag   | gaggtcacaa | cgtcgaacgg | cgagactacg | 1800 |
|    | gtcgctaata | accttaccag | cacggttcag   | atatttgcgg | actcgtcgta | tgagctcccg | 1860 |
| 35 | tacgtgatgg | acgctggaca | agagggaagt   | ctgtctcctt | tccccaatga | cgtcttcatg | 1920 |
| •  | gtgcctcaat | atggctactg | tggcattgtg   | actggcgaaa | atcagaacca | gacggacaga | 1980 |
|    | aatgctttct | actgcctgga | gtattttcct   | tcacaaatgc | tgagaactgg | caataacttt | 2040 |
| 40 | gaaatggctt | acaactttgg | gaaggtgccg   | ttccactcaa | tgtatgctta | cagccagagc | 2100 |
|    | ccggacagac | tgatgaatcc | cctcctggac   | cagtacctgt | ggcacttaca | gtcgaccacc | 2160 |
|    | tctggagaga | ctctgaatca | aggcaatgca   | gcaaccacat | ttggaaaaat | caggagtgga | 2220 |
| 45 | gactttgcct | tttacagaaa | gaactggctg   | cctgggcctt | gtgttaaaca | gcagagactc | 2280 |
|    | tcaaaaactg | ccagtcaaaa | ttacaagatt   | cctgccagcg | ggggcaacgc | tctgttaaag | 2340 |
|    | tatgacaccc | actatacctt | aaacaaccgc   | tggagcaaca | tagcgcctgg | acctccaatg | 2400 |
| 50 | gcaacagctg | gaccttcaga | tggggacttc   | agcaacgccc | agctcatctt | ccctggacca | 2460 |
|    | tcagtcaccg | gaaacacaac | aacctcagca   | aacaatctgt | tgtttacatc | agaagaagaa | 2520 |
|    | attgctgcca | ccaacccaag | agacacggac   | atgtttggtc | agattgctga | caataatcag | 2580 |
| 55 | aatgctacaa | ctgctcccat | aaccggcaac   | gtgactgcta | tgggagtgct | tcctggcatg | 2640 |

|    | gtgtggcaaa | acagagacat | ttactaccaa | gggccaattt | gggccaagat | cccacacgcg | 2700 |
|----|------------|------------|------------|------------|------------|------------|------|
| 5  | gacggacatt | ttcatccttc | accgctaatt | ggcggttttg | gactgaaaca | teegeeteee | 2760 |
|    | cagatattta | tcaaaaacac | ccccgtacct | gccaatcctg | cgacaacctt | cactgcagcc | 2820 |
|    | agagtggact | ctttcatcac | acaatacagc | accggccagg | tcgctgttca | gattgaatgg | 2880 |
| 10 | gaaatcgaaa | aggaacgctc | caaacgctgg | aatcctgaag | tgcagtttac | ttcaaactat | 2940 |
|    | gggaaccagt | cttctatgtt | gtgggctccc | gatacaactg | ggaagtatac | agagccgcgg | 3000 |
|    | gttattggct | ctcgttattt | gactaatcat | ttgtaactgc | ctagttaatc | aataaaccgt | 3060 |
| 15 | gtgattcgtt | tcagttgaac | tttggtctct | gcgaagggcg | aattc      |            | 3105 |
|    | -          |            |            |            |            |            |      |
|    | <210> 20   |            |            |            |            |            |      |
|    | <211> 3105 |            |            |            |            |            |      |

<210> 20 <211> 3105 <212> DNA <213> new AAV serotype, clone C3

<400> 20

30

20

25

**35** 

40

45

50

| gaattcgccc | ttgctgcgtc | aactggacca | atgagaactt | tcccttcaac | gattgcgtcg | 60   |
|------------|------------|------------|------------|------------|------------|------|
| acaagatggt | gatctggtgg | gaggagggca | agatgaccgc | caaggtcgtg | gagtccgcca | 120  |
| aggccattct | gggcggaagc | aaggtgcgcg | tggaccaaaa | gtgcaagtca | tcggcccaga | 180  |
| tcgaccccac | gcccgtgatc | gtcacctcca | acaccaacat | gtgcgccgtg | atcgacggga | 240  |
| acagcaccac | cttcgagcac | cagcagccgc | tgcaggaccg | catgttcaag | ttcgagctca | 300  |
| cccgccgtct | ggagcacgac | tttggcaagg | tgaccaagca | ggaagtcaaa | gagttcttcc | 360  |
| gctgggctca | ggatcacgtg | actgaggtgg | cgcatgagtt | ctacgtcaga | aagggcggag | 420  |
| ccaccaaaag | acccgcccc  | agtgacgcgg | atataagcga | gcccaagcgg | gcctgcccct | 480  |
| cagttgcgga | gccatcgacg | tcagacgcgg | aagcaccggt | ggactttgcg | gacaggtacc | 540  |
| aaaacaaatg | ttctcgtcac | gcgggcatgc | ttcagatgct | gtttccctgc | aagacatgcg | 600  |
| agagaatgaa | tcagaatttc | aacgtctgct | tcacgcacgg | ggtcagagac | tgctcagagt | 660  |
| gcttccccgg | cgcgtcagaa | tctcaacccg | tcgtcagaaa | aaagacgtat | cagaaactgt | 720  |
| gcgcgattca | tcatctgctg | gggcgggcac | ccgagattgc | gtgttcggcc | tgcgatctcg | 780  |
| tcaacgtgga | cttggatgac | tgtgtttctg | agcaataaat | gacttaaacc | aggtatggct | 840  |
| gctgacggtt | atcttccaga | ttggctcgag | gacaacctct | ctgagggcat | tcgcgagtgg | 900  |
| tgggacctga | aacctggagc | ccccaagctc | aaggccaacc | agcagaagca | ggacgacggc | 960  |
| cggggtctgg | tgcttcctgg | ctacaagtac | ctcggaccct | tccacggact | cgacaagggg | 1020 |
| gagcccgtca | acgcggcgga | cgcagcggcc | ctcgagcacg | acaaggccta | cgaccagcag | 1080 |
| ctcaaagcgg | gtgacaatcc | gtacctgcgg | tataaccacg | ccgacgccga | gtttcaggag | 1140 |
| cgtctgcaag | aagatacgtc | ttttgggggc | aacctcgggc | gagcagtett | CCAGGCCAAG | 1200 |

|    | aagagggta  | c tcgaaccact | t gggcctggt1 | t gaagaaggt  | g ctaagacgg  | tcctggaaag   | 1260         |
|----|------------|--------------|--------------|--------------|--------------|--------------|--------------|
| £  | aagagaccg  | t tagagtcaco | acaagagee    | gactcctcc    | t caggaatcg  | g caaaaaaggc | 1320         |
| 5  | aaacaacca  | g ccaaaaagaq | actcaactt1   | gaagaggac    | a ctggagccg  | g agacggaccc | 1380         |
|    | cctgaagga  | t cagatacca  | g cgccatgtct | tcagacatto   | g aaatgcgtgo | agcaccgggc   | 1440         |
| 10 | ggaaatgct  | g tegatgeggg | g acaaggttco | : gatggagtgg | gtaatgccto   | gggtgattgg   | 1500 `       |
|    | cattgcgatt | t ccacctggtc | : tgagggcaag | gtcacaacaa   | cctcgaccac   | aacctgggtc   | 1560         |
|    | ttgcccacct | acaacaacca   | cttgtacctg   | cggctcggaa   | a caacatcaaa | cagcaacacc   | 1620         |
| 15 | tacaacggat | totocacco    | ctggggatac   | tttgacttta   | acagattcca   | ctgtcacttc   | 1680         |
|    | tcaccacgto | , actggcaaag | actcatcaac   | aacaactggg   | gactacgaco   | aaaagccatg   | 1740         |
|    | cgcgttaaaa | tcttcaatat   | ccaagttaag   | gaggtcacaa   | cgtcgaacgg   | cgagactacg   | 1800         |
| 20 | gtcgctaata | accttaccag   | cacggttcag   | atatttgcgg   | actogtogta   | tgagctcccg   | 1860         |
|    | tacgtgatgg | acgctggaca   | agagggaagt   | ctgcctcctt   | tccccaatga   | cgtcttcatg   | 1920         |
|    | gtgcctcaat | atggctactg   | tggcattgtg   | actggcgaaa   | atcagaacca   | gacggacaga   | 1980         |
| 25 | aatgctttct | actgcctgga   | gtattttcct   | tcacaaatgc   | tgagaactgg   | caataacttt   | 2040         |
|    | gaaatggctt | acaactttga   | gaaggtgccg   | ttccactcaa   | tgtatgctca   | cagccagagc   | 2100         |
|    | ctggacagac | tgatgaatcc   | cctcctggac   | cagtacctgt   | ggcacttaca   | gtcgaccacc   | 2160         |
| 30 | tctggagaga | ctctgaatca   | aggcaatgca   | gcaaccacat   | ttggaaaaat   | caggagtgga   | 2220         |
|    | gactttgcct | tttacagaaa   | gaactggctg   | cctgggcctt   | gtgttaaaca   | gcagagattc   | 2280         |
| ,  | tcaaaaactg | ccagtcaaaa   | ttacaagatt   | cctgccagcg   | ggggcaacgc   | tctgttaaag   | 2340         |
| 35 | tatgacaccc | actatacctt   | aaacaaccgc   | tggagcaaca   | tagcgcctgg   | acctccaatg   | 2400         |
|    | gcaacagctg | gaccttcaga   | tggggacttc   | agcaacgccc   | agctcatctt   | ccctggacca   | 2460         |
|    |            | gaaacacaac   |              |              |              |              | 2520         |
| 40 | attgctgcca | ccaacccaag   | agacacggac   | atgtttggtc   | agattgctga   | caataatcag   | 2580         |
|    | aatgctacaa | ctgctcccat   | aaccggcaac   | gtgactgcta   | tgggagtgct   | tcctggcatg   | 2640         |
|    | gtgtggcaaa | acagagacat   | ttactaccaa   | gggccaattt   | gggccaagat   | cccacacgcg   | 270 <b>0</b> |
| 45 | gacggacatt | ttcatccttc   | accgctaatt   | ggcggttttg   | gactgaaaca   | teegeeteee   | 2760         |
|    | cagatattta | tcaaaaacac   | ccccgtacct   | gccaatcctg   | cgacaacctt   | cactgcagcc   | 2820         |
|    | agagtggact | ctttcatcac   | acaatacagc   | accggccagg   | togotgttca   | gattgaatgg   | 2880         |
| 50 | gaaatcgaaa | aggaacgctc   | caaacgccgg   | aatcctgaag   | tgcagtttac   | ttcaaactat   | 2940         |
|    | gggaaccagt | cttctatgtt   | gtgggctccc   | gatacaactg   | ggaagtatac   | agagccgcgg   | 3000         |
|    | gttattggct | ctcgttattt   | gactaatcat   | ttgtaactgc   | ctagttaatc   | aataaaccgt   | 3060         |
| 55 | gtgattcgtt | tcagttgaac   | tttggtctct   | gcgaagggcg   | aattc        |              | 3105         |

<210> 21

<211> 3105 <212> DNA <213> new AAV serotype, clone C5

<400> 21

|    | gaattcgccc  | ttcgcagaga | ccaaagttca | actgaaacga | atcacacggt | ttattgatta | . 60 |
|----|-------------|------------|------------|------------|------------|------------|------|
| 10 | actaggcagt  | tacaaatgat | tagtcaaata | acgagagcca | ataacccgcg | gctctgtata | 120  |
|    | cttcccagtt  | gtatcgggag | cccacaacat | agaagactgg | ttcccacagt | ttgaagtaaa | 180  |
|    | ctgcacttca  | ggattccagc | gtttggagcg | ttccttttcg | atttcccatt | caatctgaac | 240  |
| 15 | agcgacctgg  | ccggtgctgt | attgtgtgat | gaaagagtcc | actctggctg | cagtgaaggt | 300  |
|    | tgtcgcagga  | taggcaggta | cgggggtgtt | tttgataaat | atctggggag | gcggatgttt | 360  |
|    | cagtccaaaa  | ccgccaatta | gcggtgaagg | atgaaaatgt | ccgtccgcgt | gtgggatett | 420  |
| 20 | ggcccaaatt  | ggcccttggt | agtamatgtc | tctgttttgc | cacaccatgc | caggaagcac | 480  |
|    | tcccatagca  | gtcacgttgc | cggttatggg | agcagttgta | gcattctgat | tattgtcagc | 540  |
|    | aatctgacca  | aacatgtccg | tgtctcttgg | gttggtggca | gcaatttctt | cttctgatgt | 600  |
| 25 | aaacaacaga  | ttgtttgctg | aggttgttgt | gtttccggtg | actgatggtc | cagggaagat | 660  |
|    | gagctgggcg  | ttgctgaagt | ccccatctga | aggtccagct | gttgccattg | gaggtccagg | 720  |
|    | cgctatgttg  | ctccagcggt | tgtttaaggt | atagtgggtg | tcatacttta | acagagcgtt | 780  |
| 30 | geceegetg   | gcaggaatct | tgtaattttg | actggcagtt | tttgagaatc | tctgctgttt | 840  |
|    | aacacaaggc  | ccaggcagcc | agttctttct | gtaaaaggca | aagtctccac | tcctgatttt | 900  |
|    | tccaaatgtg  | gttgctgcat | tgccttgatt | cagagtetet | ccagaggtgg | tcgactgtaa | 960  |
| 35 | gtgccacagg  | tactggtcca | ggaggggatt | catcagtccg | tccaggctct | ggctgtgagc | 1020 |
|    | atacattgag. | tggaacggca | ccttctcaaa | gttgtaagcc | gtttcaaagt | tattgccagt | 1080 |
|    | tctcagcatt  | tgtgaaggaa | aatactccag | gcagtagaaa | gcatttctgt | ccgtctggtt | 1140 |
| 40 | ctgattttcg  | ccagtcacaa | tgccacagta | gccatattga | ggcaccatga | agacgtcatt | 1200 |
|    | ggggaaagga  | ggcagacttc | cctcttgtcc | agcgtccatc | acgtacggga | gctcatacga | 1260 |
|    | cgagtccgca  | aatatctgaa | ccgtgctggt | aaggttatta | gcgaccgtag | totogoogtt | 1320 |
| 45 | cgacgttgtg  | acctccttaa | cttggatatt | gaagatttta | acgcgcatgg | cttttggtcg | 1380 |
|    | tagtccccag  | ttgttgttga | tgagtctttg | ccagtcacgt | ggtgagaagt | gacagtggaa | 1440 |
|    | tctgttaaag  | tcaaagtatc | cccagggggt | ggagaatccg | ttgtaggtgt | tgctgtttga | 1500 |
| 50 | tgttgttccg  | agccgcaggt | acaagtggtt | gttgtaggtg | ggcaagaccc | aggttctggt | 1560 |
|    | cgaggttgtt  | gtgaccttgc | cctcagacca | ggtggaatcg | caatgccaat | cacccgaggc | 1620 |
|    | attacccact  | ccatcggaac | cttgtcccgc | atcgacagca | tttccgcccg | gtgctgcacg | 1680 |
| 55 | catttcaatg  | tctgaagaca | tggcgctggt | atctgatcct | tcagggggtc | cgtctccggc | 1740 |

1800

1860

tocagtgtcc tottcaaagt tgagtotott tttggctggt tgtttgcctt ttttgccgat

tectgaggag gagteggget ettgtggtga etetaaeggt etettette eaggageegt

| 5      | cttagcacct tetteaacca ggeecagagg ttegagtace etettettgg eetggaag  | ac 1920 |
|--------|------------------------------------------------------------------|---------|
|        | tgctcgcccg aggttgcccc caaaagacgt atcttcttgc agacgctcct gaaactcg  | gc 1980 |
|        | gtoggogtgg ttatacogca ggtacggatt gtoaccogct ttgagotgot ggtogtag  | gc 2040 |
| 10     | cttgtcgtgc tcgagggccg ctgcgtccgc cgcgttgacg ggctccccct tgtcgagt  | cc 2100 |
|        | gttgaagggt ccgaggtact cgtagccagg aagcaccaga ccccggccgt cgtcctgc  | tt 2160 |
| 15     | ctgctggttg gccttgggct tgggggctcc aggtttcagg tcccaccact cgcgaatg  | cc 2220 |
| 15     | ctcagagagg ttgtcctcga gccaatctgg aagataaccg tcagcagcca tacctggt  | tt 2280 |
|        | aagtcattta ttgctcagaa acacagtcat ccaagtccac gttgacgaga tcgcaggc  | eg 2340 |
| 20     | aacacgcaat ctcgggtgcc cgccccagca gatgatgaat cgcgcacagt ttctgata  | eg 2400 |
| 20     | tetttttet gaegaegggt tgagattetg aegegeeggg gaageaetet gageagte   | C 2460  |
|        | tgaccccgtg cgtgaagcag acgttgaaat tctgattcat tctctcgcat gtcttgcag | gg 2520 |
| 25     | gaaacagcat ctgaagcatg cccgcgtgac gagaacattt gttttggtac ctgtccgca | a 2580  |
|        | ggtccaccgg tgcttccgcg tctgacgtcg atggctccgc aactgagggg caggcccgc | t 2640  |
|        | tgggctcgct tatatccgcg tcactggggg cgggtctttt ggtggctccg ccctttctc | ra 2700 |
| 30     | cgtagaactc atgegeeacc teagteacgt gateetgage ecageggaag aactetteg | ra 2760 |
|        | cttectgett ggteacettg ceaaagtegt getecagaeg gegggtgage tegaaettg | ra 2820 |
|        | acatgoggto otgoagoggo tgotggtgot ogaaggtggt gotgttocog togatoacg | rg 2880 |
| 35     | cgcacatgtt ggtgttggag gtgacgatca cgggcgtggg gtcgatctgg gccgatgac | t 2940  |
| •      | tgcacttttg gtccacgcgc accttgcttc cgcccagaat ggccttggcg gactccacg |         |
| *,     | cettggeggt catettgeee tecteceace agateaceat ettgtegacg caategttg | a 3060  |
| 40     | agggaaagtt ctcattggtc cagttgacgc agcaagggcg aattc                | 3105    |
|        | <210> 22                                                         |         |
|        | <211> 3094<br><212> DNA                                          |         |
| 45     | <213> new AAV serotype, clone F1                                 |         |
|        | <400> 22                                                         |         |
| <br>50 | gaattcgccc ttgctgcgtc aactggacca agagaacttt cccttcaacg attgcgtcg | a 60    |
|        | caagatggtg atctggtggg aggagggcaa gatgacggcc aaggtcgtgg agtccgcca | a 120   |
|        | agccattctg ggcggaagca aggtgcgcgt cgaccaaaag tgcaagtcct cggcccaga | t 180   |
| 55     | cgateccace eccgtgateg teacetecaa caccaacatg tgegeegtga tegaeggga | a 240   |
|        | cagcaccacc ttcgagcacc agcagccgtt gcaggaccgg atgttcaaat ttgaactca | = 300   |
|        |                                                                  |         |

|    | cogcogtat  | g gaacacgact | ttggcaaggt | gaccaagca  | g gaagtcaaaq | agttetteeg | 3 60 |
|----|------------|--------------|------------|------------|--------------|------------|------|
| 5  | ctgggctag  | t gatcacgtga | ctgaggtgac | gcatgagtto | tacgtcagaa   | agggcggagc | 420  |
|    | cagcaaaag  | a cccgcccccg | atgacgcgga | tataagcgag | g cccaagcggg | cctgtccctc | 480  |
|    | agtcacgga  | c ccatcgacgt | cagacgcgga | aggagetee  | gtggactttg   | ccgacaggta | 540  |
| 10 | ccaaaacaa  | a tgttctcgtc | acgcgggcat | gcttcagatq | ctgtttecet   | gcaaaacgtg | 600  |
|    | cgagagaat  | g aatcagaatt | tcaacatttg | cttcacgcac | ggggtcagag   | actgtttaga | 660  |
|    | atgtttccc  | ggcgtgtcag   | aatctcaacc | ggtcgtcaga | aaaaagacgt   | atcggaagct | 720  |
| 15 | gtgtgcgatt | catcatctgc   | tggggcgggc | acccgagatt | gcttgctcgg   | cctgcgacct | 780  |
|    | ggtcaacgtg | gacctggacg   | actgtgtttc | tgagcaataa | atgacttaaa   | ccgggtatgg | 840  |
|    | ctgccgatgg | ttatcttcca   | gattggctcg | aggacaacct | ctctgagggc   | attcgcgagt | 900  |
| 20 | ggtgggacct | gaaacctgga   | gccccgaaac | ccaaagccaa | ccagcaaaag   | caggacgacg | 960  |
|    | gccggggtct | ggtgcttcct   | ggctacaagt | acctcggacc | cttcaacgga   | ctcgacaagg | 1020 |
|    | gggagcccgt | caacgcggcg   | gacgcagcgg | ccctcgagca | cgacaaggcc   | tacgaccagc | 1080 |
| 25 | agctcaaagc | gggtgacaat   | ccgtacctgc | ggtataacca | cgccgacgcc   | gagtttcagg | 1140 |
|    | agcgtctgca | agaagatacg   | tcatttgggg | gcaacctcgg | gcgagcagtc   | ttccaggcca | 1200 |
|    | agaagcgggt | tetegaacet   | ctcggtctgg | ttgaggaagg | cgctaagacg   | gctcctggaa | 1260 |
| 30 | agaagagacc | catagactet   | ccagactcct | ccacgggcat | cggcaaaaaa   | ggccagcagc | 1320 |
|    | ccgctaaaaa | gaagctcaat   | tttggtcaga | ctggcgactc | agagtcagtc   | cccgaccctc | 1380 |
|    | aacctcttgg | agaacctcca   | gcagcgccct | ctagtgtggg | atctggtaca   | atggctgcag | 1440 |
| 35 | gcggtggcgc | accaatggca   | gacaataacg | aaggtgccga | cggagtgggt   | aatgcctcag | 1500 |
|    | gaaattggca | ttgcgattcc   | acatggctgg | gcgacagagt | catcaccacc   | agcaccagaa | 1560 |
|    | cctgggccct | ccccacctac   | aacaaccacc | tctacaagca | aatctccagc   | agcagctcag | 1620 |
| 40 | gagccaccaa | tgacaaccac   | tacttcggct | acagcacccc | ctgggggtat   | tttgacttta | 1680 |
|    | acagatteca | ctgccacttc   | tcaccacgtg | actggcagcg | actcatcaac   | aacaactggg | 1740 |
|    | gattccggcc | caagaagctg   | cggttcaagc | tcttcaacat | ccaggtcaag   | gaggtcacaa | 1800 |
| 45 | cgaatgacgg | cgtcacgacc   | atcgctaata | accttaccag | cacggttcag   | gtettetegg | 1860 |
|    | actoggaata | ccagctgccg   | tacgtcctcg | gctctgcgca | ccagggctgc   | ctgcctccgt | 1920 |
|    | tcccggcgga | cgtcttcatg   | attecteagt | acggctacct | gactctgaac   | aacggcagcc | 1980 |
| 50 | aatcggtggg | ccgttcctcc   | ttctactgcc | tggaatattt | cccctctcaa   | atgctgagaa | 2040 |
|    | cgggcaacaa | ctttgagttc   | agttacagct | tcgaggacgt | gcctttccac   | agcagctacg | 2100 |
|    | cgcacagcca | gagcctagac   | cggctgatga | acceteteat | cgaccagtac   | ctgtactacc | 2160 |
| 55 | tggcccggac | ccagagcacc   | acgggttcca | ccagggaact | gcaatttcat   | caagctgggc | 2220 |
|    |            |              |            |            |              |            |      |

|    | CCAGCACCAC | ggccgagcag | tcaaagaact | ggctgcctgg | accetgetat | aggcaacagg | 2280 |
|----|------------|------------|------------|------------|------------|------------|------|
| 5  | gactgtcaaa | gaacttggac | tttaacaaca | acagcaattt | tgcctggact | gctgccacta | 2340 |
| 5  | aatatcatct | gaatggcaga | aactctttga | ccaatcctgg | cattcccatg | gcaaccaaca | 2400 |
| •  | aggatgatga | ggaccagttc | tttcccatca | acggggtact | ggtttttggc | aagacgggag | 2460 |
| 10 | ctgccaacaa | aactacgctg | gaaaacgttc | tgatgaccag | cgaggaggag | atcaagacca | 2520 |
| 10 | ctaaccctgt | ggctacagaa | gaatacggtg | tggtctccag | caacctgcag | ccgtctacag | 2580 |
|    | ccgggcctca | atcacagact | atcaacagcc | agggagcact | gcctggcatg | gtctggcaga | 2640 |
| 15 | accgggacgt | gtatctgcag | ggtcccatct | gggccaaaat | tcctcacacg | gatggcaact | 2700 |
|    | ttcacccgtc | tcctctgatg | ggcggttttg | gactcaaaca | cccgcctcca | cagatootga | 2760 |
|    | tcaaaaacac | acctgtacct | gctaatcctc | cggaggtgtt | tactcctgcc | aagtttgcct | 2820 |
| 20 | ccttcatcac | gcagtacagc | accggacaag | tcagcgtgga | aatcgagtgg | gagctgcaga | 2880 |
|    | aagaaaacag | caagcgctgg | aacccagaaa | ttcagtatac | ttccaattat | gccaagtcta | 2940 |
|    | ataatgttga | atttgctgtg | aaccctgatg | gtgtttatac | tgagcctcgc | cccattggca | 3000 |
| 25 | ctcgttacct | ccccgtaat  | ctgtaattgc | ttgttaatca | ataaaccggt | tgattcgttt | 3060 |
|    | cagttgaact | ttggtctctg | cgaagggcga | attc       |            |            | 3094 |

30
 <210> 23
 <211> 3095
 <212> DNA
 <213> new AAV serotype, clone F3

35 <400> 23

|     | gaattcgccc | ttcgcagaga | ccaaagttca | actgaaacga | atcaaccggt | ttattgatta | 60  |
|-----|------------|------------|------------|------------|------------|------------|-----|
|     | acaagcaatt | acagattacg | ggtgaggtaa | cgagtgccaa | tggggcgagg | ctcagtataa | 120 |
| 5   | acaccatcag | ggttcacagc | aaattcaaca | ttattagact | tggcataatt | ggaagtatac | 180 |
|     | tgaatttctg | ggttccagcg | cttgctgttt | tctttctgca | gctcccactc | gatttccacg | 240 |
| • • | ctgacttgtc | cggtgctgta | ctgcgtgatg | aaggaggcaa | acttggcagg | agtaaacacc | 300 |
| 10  | tccggaggat | tagcaggtac | aggtgtgttt | ttgatcagga | tctgtggagg | cgggtgtttg | 360 |
|     | agtccaaaac | cgcccatcag | aggagacggg | tgaaagttgc | catccgtgtg | aggaattttg | 420 |
|     | gcccagatgg | gaccctgcag | atacacgtcc | cggttctgcc | agaccatgcc | aggcagtgct | 480 |
| 15  | ccctggctgt | tgatagtctg | tgattgaggc | ccggctgtag | acgactgcag | gttgctggag | 540 |
|     | accacaccgt | attettetgt | agccacaggg | ttagtggtct | tgatctcctc | ctcgctggtc | 600 |
|     | atcagaacgt | tttccagcgt | agttttgttg | gcageteceg | tcttgccaaa | aaccagtacc | 660 |
| 20  | ccgttgatgg | gaaagaactg | gtcctcatca | tccttgttgg | ttgccatggg | aatgccagga | 720 |
|     | ttggtcaaag | agtttctgcc | attcagatga | tatttagtgg | cagcagtcca | ggcaaaattg | 780 |

|    | ctgttgttgt | taaagtcca  | a gttctttga  | c agtototgti | t gcctatagc | a gggtccaggc | 840    |
|----|------------|------------|--------------|--------------|-------------|--------------|--------|
| 5  | agccagttct | ttgactgct  | c ggccatagt  | a ttgggccca  | g cttgatgaa | a ttgcagttcc | 900    |
|    | ctggtggaac | ccgtggtgc  | t ctgggtccg  | g gccaggtagt | t acaggtact | g gtcgatgaga | 960    |
|    | gggttcatca | gccggtcta  | g getetggét  | g tgcgcgtago | c tgctgtgga | a aggcacgtcc | 1020   |
| 10 | tcgaagctgt | aactgaact  | aaagttgtt    | g cccgttctce | gcatttgag   | a ggggaaatat | 1080   |
|    | tccaggcagt | agaaggagg  | a acggcccac  | gattggctgc   | cgttgtcca   | g agtcaggtag | 1140   |
|    | ccgtactgag | gaatcatgaa | a gacgtccgcd | gggaacggag   | gcaggcagco  | : ctggtgcgca | 1200   |
| 15 | gagccgagga | cgtacggcag | ctggtattco   | : gagtccgaga | agacctgaac  | cgtgctggta   | 1260   |
|    | aggttattag | cgatggtcgt | gacgccgtca   | ttcgttgtga   | cctccttgac  | ctggatgttg   | 1320   |
|    | aggagcttga | accgcagett | cttgggccgg   | aatccccagt   | tgttgttgat  | gagtcgctgc   | 1380   |
| 20 | cagtcacgtg | gtgagaagtg | gcagtggaat   | ctgttaaagt   | caaaatacco  | ccagggggtg   | 1440   |
|    | ctgtagccga | agtagtggtt | gtcattggtg   | gctcctgagc   | tgctgctgga  | gatttgcttg   | 1500   |
|    | tagaggtggt | tgttgtaggt | ggggagggcc   | caggttctgg   | tgctggtggt  | gatgactctg   | 1560   |
| 25 | tcgcccagcc | atgtggaatc | gcaatgccaa   | tttcctgagg   | cattacccac  | tccgtcggca   | 1620   |
|    | ccttcgttat | tgtctgccat | tggtgcgcca   | ccgcctgcag   | ccattgtacc  | agatcccaca   | 1680   |
|    | ctagagggcg | ctgctggagg | ttctccaaga   | ggttgagggt   | cggggactga  | ctctgagtcg   | 1740   |
| 30 | ccagtctgac | caaaattgag | cttcttttta   | gcgggctgct   | ggccttttt   | gccgatgccc   | . 1800 |
|    | gtggaggagt | ctggagagcc | tatgggtctc   | ttctttccag   | gagccgtctt  | agcgccttcc   | 1860   |
|    | tcaaccagac | cgagaggttc | gagaacccgc   | ttcttggcct   | ggaagactgc  | tegecegagg   | 1920   |
| 35 | ttgcccccaa | atgacgtatc | ttcttgcaga   | cgctcctgaa   | acteggegte  | ggcgtggtta   | 1980   |
|    | taccgcaggt | acggattgtc | accegetttg   | agctgctggt   | cgtaggcctt  | gtcgtgctcg   | 2040   |
|    | agggccgctg | cgtccgccgc | gttgacgggc   | tececettgt   | cgagtccgtt  | gaagggtccg   | 2100   |
| 40 | aggtacttgt | agccaggaag | caccagaccc   | cggccgtcgt   | cctgcttttg  | ctggttggct   | 2160   |
|    | ttgggtttcg | gggctccagg | tttcaggtcc   | caccactcgc   | gaatgccctc  | agagaggttg   | 2220   |
|    | tcctcgagcc | aatctggaag | ataaccatcg   | gcagccatac   | ctggtttaag  | tcatttattg   | 2280   |
| 45 | ctcagaaaca | cagtcgtcca | ggtccacgtt   | gaccaggtcg   | caggccgagc  | aagcaatctc   | 2340   |
| •  | gggtgcccgc | cccagcagat | gatgaatcgc   | acacagette   | cgatacgtct  | tttttctgac   | 2400   |
|    | gaccggttga | gattctgaca | cgccggggaa   | acattctaaa   | cagtctctga  | cccgtgcgt    | 2460   |
| 50 | gaagcaaatg | ttgaaattct | gattcattct   | ctcgcacgtt   | ttgcagggaa  | acagcacttg   | 2520   |
|    | aagcatgccc | gcgtgacgag | aacatttgtt   | ttggtacctg   | tcggcaaagt  | ccaccggagc   | 2580   |
|    | tccttccgcg | tctgacgtcg | atgggtccgt   | gactgaggga   | cgggcccgct  | tgggctcgct   | 2640   |
| 55 | tatatccgcg | tcatcggggg | cgggtctttt   | gctggctccg   | ccctttctga  | cgtagaactc   | 2700   |
|    |            |            |              |              |             |              |        |

|    | atgcgtcacc      | tcagtcacgt        | gatcactagc | ccagcggaag | aactctttga | cttcctgctt | 2760 |
|----|-----------------|-------------------|------------|------------|------------|------------|------|
| 5  | tgtcaccttg      | ccaaagtcgt        | gttccagacg | gcgggtgagt | tcaaatttga | acatccggtc | 2820 |
| 3  | ctgcaacggt      | tgctggtgct        | cgaaggtggt | gctgttcccg | tcgatcacgg | cgcacatgtt | 2880 |
|    | ggtgttggag      | gtgacgatca        | cgggggtggg | atcgatctgg | gcggacgact | tgcacttttg | 2940 |
| 10 | gtccacgcgc      | accttgctgc        | cgccgagaat | ggccttggcg | gactccacga | ccttggccgt | 3000 |
|    | catcttgccc      | tcctcccacc        | agatcaccat | cttgtcgacg | caatcgttga | agggaaagtt | 3060 |
|    | ctcattggtc      | cagttgacgc        | agcaagggcg | aattc      |            |            | 3095 |
| 15 |                 | ٠                 |            |            |            |            |      |
|    | <210> 24        |                   |            |            |            |            |      |
|    | <211> 3095      |                   |            |            |            |            |      |
|    | <212> DNA       |                   |            |            |            |            |      |
|    | <213> new AAV s | serotype, clone F | 5          |            |            |            | •    |
| 20 | <400> 24        | - ,·              |            |            |            |            | •    |
|    |                 |                   |            |            |            |            | ٠.   |
| 25 |                 |                   |            |            |            |            |      |
| 25 |                 |                   |            |            |            |            |      |
|    |                 |                   |            |            |            |            |      |
|    |                 | •                 |            |            |            |            |      |
|    |                 |                   |            | •          |            |            |      |
| 30 |                 |                   |            |            |            | •          |      |

|     | gaattcgccc | ttcgcagaga | ccaaagttca | actgaaacga | atcaaccggt   | ttattgatta | 60   |
|-----|------------|------------|------------|------------|--------------|------------|------|
|     | acaagcaatt | acagattacg | ggtgaggtaa | cgagtgccaa | tggggcgagg   | ctcagtataa | 120  |
| 5   | acaccatcag | ggttcacagc | aaattcaaca | ttattagact | : tggcataatt | ggaagtatac | 180  |
|     | tgaatttctg | ggttccagcg | cttgctgttt | totttctgca | gctcccactc   | gatttccacg | 240  |
|     | ctgacttgtc | cggtgctgta | ctgcgtgatg | aaggaggcaa | acttggcagg   | agtasacacc | 300  |
| 10  | tccggaggat | tagcaggtac | aggtgtgttt | ttgatcagga | tctgtggagg   | cgggtgttcg | 360  |
| • . | agtccaaaac | cgcccatcag | aggagacggg | tgaaagttgc | catccgtgtg   | aggaattttg | 420  |
|     | gcccagatgg | gaccctgcag | atacacgtcc | cggttctgcc | agaccatgcc   | aggcagtgct | 480  |
| 15  | ccctggctgt | tgatagtctg | tgattgaggc | ccggctgtag | acgactgcag   | gttgctggag | 540  |
|     | accacaccgt | attcttctgt | agccacaggg | ttagtggtct | tgatctcctc   | ctcgctggtc | 600  |
| •   | atcagaacgt | tttccagcgt | agttttgttg | gcagctcccg | tcttgccaaa   | aaccagtacc | 660  |
| 20  | ccgttgatgg | gaaagaactg | gtcctcatca | tccttgttgg | ttgccatggg   | aatgccagga | 720  |
|     | ttggtcaaag | agtttctgcc | attcagatga | tatttagtgg | cagcagtcca   | ggcaaaattg | 780  |
|     | ctgttgttgt | taaagtccaa | gttctttgac | agtctctgtt | gcctatagca   | gggtccaggc | 840  |
| 25  | agccagttct | ttgactgctc | ggccatagta | ttgggcccag | cttgatgaaa   | ttgcagttcc | 900  |
|     | ctggtggaac | ccgtggtgct | ctgggtccgg | gccaggtagt | acaggtactg   | gtcgatgaga | 960  |
|     | gggttcatca | gccggtctag | gctctggctg | tgcgcgtagc | tgctgtggaa   | aggcacgtcc | 1020 |
| 30  | tcgaagctgt | aactgaactc | aaagttgttg | cccgttctca | gcatttgaga   | ggggaaatat | 1080 |
|     | tccaggcagt | agaaggagga | acggcccacc | gattggctgc | cgttgttcag   | agtcaggtag | 1140 |
|     | ccgtactgag | gaatcatgaa | gacgtccgcc | gggaacggag | gcaggcagcc   | ctggtgcgca | 1200 |
| 35  | gagccgagga | cgtacggcag | ctggtattcc | gagtccgaga | agacctgaac   | cgtgctggta | 1260 |
|     | aggttattag | cgatggtcgt | gacgccgtca | ttcgttgtga | cctccttgac   | ctggatgttg | 1320 |

| aagagcttga | a accgcagctt | cttgggccgg | aatccccagt | tgttgttgat | gagtcgctgc | 1380 |
|------------|--------------|------------|------------|------------|------------|------|
| cagtcacgt  | g gtgagaagtg | gcagtggaat | ctgttaaagt | caaaataccc | ccagggggtg | 1440 |
| ctgtagccg  | a agtagtggtt | gtcattggtg | gctcctgago | tgctgctgga | gatttgcttg | 1500 |
| tagaggtggt | tgttgtaggt   | ggggagggcc | caggttctgg | tgctggtggt | gatgactctg | 1560 |
| tegeceaged | atgtggaatc   | gcaatgccaa | tttcctgagg | cattacccac | tccgtcggca | 1620 |
| ccttcgttat | tgtctgccgt   | tggtgcgcca | ccgcctgcag | ccattgtacc | agatoccaca | 1680 |
| ctagagggcg | ctgctggagg   | ttctccaaga | ggttgagggt | cggggactga | ctctgagtcg | 1740 |
| ccagtctgac | caaaattgag   | cttcttttta | gegggetget | ggccttttt  | gccgatgccc | 1800 |
| gtggaggagt | ctggagagtc   | tatgggtctc | ttctttccag | gagccgtctt | agcgccttcc | 1860 |
| tcaaccagac | cgagaggttc   | gagaacccgc | ttcttggcct | ggaagactgc | tcgcccgagg | 1920 |
| ttgccccaa  | atgacgtatc   | ttcttgcagg | cgctcctgaa | actcggcgtc | ggcgtggtta | 1980 |
| taccgcaggt | acggattgtc   | accegetttg | agctgctggt | cgtaggcctt | gtcgtgctcg | 2040 |
| agggccgctg | cgtccgccgc   | gttgacgggc | tececettgt | cgagtccgtt | gaagggtccg | 2100 |
| aggtacttgt | agccaggaag   | caccagaccc | cggccgtcgt | cctgcttttg | ctggttggct | 2160 |
| ttgggtttcg | gggctccagg   | tttcaggtcc | caccactcgc | gaatgccctc | agagaggttg | 2220 |
| tcctcgagcc | aatctggaag   | ataaccateg | gcagccatac | ctggtttaag | ccatttattg | 2280 |
| ctcagaaaca | cagtcgtcca   | ggtccacgtt | gaccaggtcg | caggccgagc | aggcaatctc | 2340 |
| gggtgcccgc | cccagcagat   | gatgaatcgc | acacagette | cgatacgtct | tttttctgac | 2400 |
| gaccggttga | gattctgaca   | cgccggggaa | acattctaaa | cagtctctga | ccccgtgcgt | 2460 |
| gaagcaaatg | ttgaaattct   | gattcattct | ctcgcacgtt | ttgcagggaa | acagcatctg | 2520 |
| aagcatgccc | gcgtggcgag   | aacatttgtt | ttggtacctg | tcggcaaagt | ccaccggagc | 2580 |
| tccttccgcg | tctgacgtcg   | atgggtccgt | gactgaggga | caggcccgct | tgggctcgct | 2640 |
| tatatccgcg | tcatcggggg   | cgggtctttt | gctggctccg | ccctttctga | cgtagaactc | 2700 |
| atgcgtcacc | tcagtcacgt   | gatcactagc | ccagcggaag | aactctttga | cttcctgctt | 2760 |
| tgtcaccttg | ccaaagtcgt   | gttccagacg | gcgggtgagt | tcaaatttga | acatccggtc | 2820 |
| ctgcaacggc | tgctggtgct   | cgaaggtggt | gctgttcccg | tcgatcacgg | cgcgcatgtt | 2880 |
| ggtgttggag | gtgacgatca   | cgggggtggg | atcgatctgg | gcggacgact | tgcacttttg | 2940 |
| gtccacgcgc | accttgctgc   | cgccgagaat | ggccttggcg | gactccacga | ccttggccgt | 3000 |
| catcttgccc | tecteccace   | agatcaccat | cttgtcgacg | caatcgttga | agggaaagtt | 3060 |
| ctcattggtc | cagttgacgc   | agcaagggcg | aattc      |            |            | 3095 |
|            |              |            |            |            |            |      |

<210> 25 

<211> 3142

<212> DNA

<213> new AAV serotype, clone H6

<400> 25

|        | aaaacgacgg   | gccagtgatt | gtaatacga   | tcactatage   | gcgaaattg  | a aattagcggc | 60   |
|--------|--------------|------------|-------------|--------------|------------|--------------|------|
| 5      | cgcgaattcg   | cctttcgcag | g agaccaaag | tcaactgaaa   | cgaattaaa  | c ggtttattga | 120  |
|        | ttaacaagca   | attacagatt | acgagtcag   | tatctggtgc   | caatggggc  | g aggctctgaa | 180  |
|        | tacacaccat   | tagtgtccac | agtaaagtco  | : acattaacag | acttgttgt  | a gttggaagtg | 240  |
| 10<br> | tactgaattt   | cgggattcca | gcgtttgctg  | tteteettet   | gcagctccca | ctcgatctcc   | 300  |
|        | acgctgacct   | gtcccgtgga | atactgtgtg  | atgaaagaag   | caaacttgg  | : agaactgaag | 360  |
| 15     | tttgtgggag   | gattggctgg | aacgggagtg  | tttttgatca   | tgatctgagg | n aggegggtgt | 420  |
| 15     | ttgagtccaa   | aacctcccat | cagtggagaa  | ggatgaaagt   | gtccatcggt | gtgaggaatc   | 480  |
|        | ttggcccaaa   | tgggtccctg | caggtacacg  | tctcgatcct   | gccacaccat | accaggtaac   | 540  |
| 20     | gctccttggt   | gattgacagt | tccagtagtt  | ggaccagtgt   | ttgagttttg | caaattattt   | 600  |
| 20     | gacacagtcc   | cgtactgctc | cgtagccacg  | ggattggtgg   | ccctgatttc | ttcttcatct   | 660  |
|        | gtaatcatga   | cattttccaa | atccgcgtcg  | ttggcatttg   | ttccttgttt | accaaatatc   | 720  |
| 25     | agggttccat   | gcatggggaa | aaacttttct  | tegteatest   | tgtgactggc | catagotggt   | 780  |
|        | cctggattaa   | ccaacgagtc | ccggccattt  | agatgatact   | ttgtagctgc | agtccaggga   | 840  |
| •      | aagttgctgt   | tgttgttgtc | gtttgcctgt  | tttgacagac   | gctgctgtct | gtagcaaggt   | 900  |
| 30     | ccaggcagcc   | agtttttagc | ttgaagagac  | atgttggttg   | gtccagcttg | gctaaacagt   | 960  |
|        | agccgagact   | gctgaagagt | tccactattt  | gtttgtgtct   | tgttcagata | atacaggtac   | 1020 |
| 1      | tggtcgatca   | gaggattcat | cagccgatcc  | agactctggc   | tgtgagcgta | gctgctgtgg   | 1080 |
| 35     | aaaggcacgt   | cttcaaaagt | gtagctgaac  | tgaaagttgt   | ttccagtacg | cagcatctga   | 1140 |
|        | gaaggaaagt   | actccaggca | gtaaaaggaa  | gagcgtccta   | ccgcctgact | cccgttgttc   | 1200 |
|        | agggtgaggt   | atccatactg | tgggaccatg  | aagacgtccg   | ctggaaacgg | cgggaggcat   | 1260 |
| 40     | ccttgatgcg   | ccgagcccag | gacgtacggg  | agctggtact   | ccgagtcagt | aaacacctga   | 1320 |
|        | accgtgctgg   | taaggttatt | ggcaatcgtc  | gtcgtaccgt   | cattctgcgt | gacctctttg   | 1380 |
|        | acttgaatat   | taaagagctt | gaagttgagt  | cttttgggcc   | ggaatccccg | gttgttgttg   | 1440 |
| 45     | acgagtettt   | gccagtcacg | tggtgaaaag  | tggcagtgga   | atctgttgaa | gtcaaaatac   | 1500 |
|        | ccccaggggg   | tgctgtagcc | aaagtagtgg  | ttgtcgttgc   | tggctcctga | ttggctggag   | 1560 |
|        | atttgcttgt a | agaggtggtt | gttgtatgtg  | ggcagggccc   | aggttcgggt | gctggtggtg   | 1620 |
| 50     | atgactctgt ( | egcccagcca | ttgggaatcg  | caatgccaat   | ttcctgagga | attacccact   | 1680 |
|        | ccatcggcac o | ctcgttatt  | gtctgccatt  | ggtgcgccac   | tgcctgtagc | cattgtagta   | 1740 |

|     | gateccagae cagagggge tgetggtgge tgteegagag getgggggte aggtaeggag    | 1800 |
|-----|---------------------------------------------------------------------|------|
|     | tetgegtete cagtetgace aaaatttaat ettttettg caggetgetg gecegetttt    | 1860 |
| 5   | coggitteecg aggaggagte tggctccaca ggagagtget ctaccggcet cttttteec   | 1920 |
|     | ggagccgtct taacaggctc ctcaaccagg cccagaggtt caagaaccct cttttcgcc    | 1980 |
|     | , tggaagactg ctcgtccgag gttgccccca aaagacgtat cttctttaag gcgctcctga | 2040 |
| 10  | aactetgegt eggegtggtt gtacttgagg taegggttgt eteegetgte gagetgeegg   | 2100 |
|     | tegtaggeet tgtegtgete gagggeegeg gegtetgeet egttgaeegg eteceeettg   | 2160 |
|     | togagtoogt tgaagggtoo gaggtacttg taccoaggaa gcacaagaco cotgotgtog   | 2220 |
| 15  | teettatgee getetgeggg etttggtggt ggtgggeeag gtttgagett ceaccactgt   | 2280 |
|     | cttattcctt cagagagagt gtcctcgagc caatctggaa gataaccatc ggcagccata   | 2340 |
|     | cctgatttaa atcatttatt gttcagagat gcagtcatcc aaatccacat tgaccagatc   | 2400 |
| 20  | gcaggcagtg caagegtetg gcacetttee catgatatga tgaatgtage acagtttetg   | 2460 |
|     | atacgccttt ttgacgacag aaacgggttg agattctgac acgggaaagc actctagaca   | 2520 |
| 4-  | gtetttetgt eegtgagtga ageagatatt tgaattetga tteattetet egeattgtet   | 2580 |
| 25  | gcagggaaac agcatcagat tcatgcccac gtgacgagaa catttgtttt ggtacctgtc   | 2640 |
|     | cgcgtagttg atcgaagctt ccgcgtctga cgtcgatggc tgcgcaactg actcgcgcgc   | 2700 |
| 20  | cegtttggge teacttatat etgegteact gggggegggt ettttettag etceaceett   | 2760 |
| 30  | tttgacgtag aattcatgct ccacctcaac cacgtgatcc tttgcccacc ggaaaaagtc   | 2820 |
|     | tttcacttcc tgcttggtga cctttccaaa gtcatgatcc agacggcggg taagttcaaa   | 2880 |
| 35  | tttgaacate eggtettgea aeggetgetg gtgetegaag gtegttgagt tecegteaat   | 2940 |
| 35  | cacggcgcac atgttggtgt tggaggtgac gatcacggga gtcgggtcta tctgggccga   | 3000 |
|     | ggacttgcat ttctggtcca cacgcacctt gcttcctcca agaatggctt tggccgactc   | 3060 |
| 40  | cacgacettg geggteatet tecceteete ceaceagate accatettgt egacgeaatg   | 3120 |
| ,,, | gtaaaaggaa agttctcatt gg                                            | 3142 |
|     | <210> 26                                                            |      |
|     | <211> 3075                                                          |      |
| 45  | <212> DNA<br><213> new AAV serotype, clone H2                       |      |
|     | <400> 26                                                            |      |
|     |                                                                     |      |
| 50  | tgagaacttt cotttcaacg attgogtogg acaagatggt gatotggtgg gaggagggga   | 60   |
|     | agatgacege caaggtegtg gagteggeea aageeattet tggaggaage aaggtgegtg   | 120  |
| EE  | tggaccagaa atgcaagtcc teggeecaga tagaccegae teeegtgate gtcaceteca   | 180  |
| 55  | acaccaacat gtgcgccgtg attgacggga actcaacgac cttcgagcac cagcagccgt   | 240  |
|     | tgcaagaccg gatgttcaaa tttgaactta cccgccgtct ggatcatgac tttggaaagg   | 300  |

|    | tcaccaagca ggaagtgaaa gactttttcc ggtgggcaaa ggatcacgtg gttgaggtgg     | 360          |
|----|-----------------------------------------------------------------------|--------------|
|    | agcatgaatt ctacgtcaaa aagggtggag ctaagaaaag acccgccccc agtgacgcag     | 420          |
| 5  | atataagtga gcccaaacgg gcgcgcgagt cagttgcgca gccatcaacg tcagacgcgg     | 480          |
|    | aagettegat caactaegeg gacaggtace aaaaacaaat gttetegtea egtgggeatg     | 540          |
|    |                                                                       | 600          |
| 10 | ttcactcacg gacagaaaga ctgtttagag tgctttcccg tgtcagaatc tcaacccgtt     | 660          |
|    | tctgtcgtca aaaaggcgta tcagaaactg tgctacattc atcatatcat                | 720          |
|    | ccagacgctt gcactgcctg cgatctggtc aatgtggatt tggatgactg catctctgaa     | 780          |
| 15 | caataaatga tttaaatcag gtatggctgc cgatggttat cctccagatt ggctcgagga     | 840          |
|    | cactototot gaagggataa gacagtggtg gaagotoaaa ootggoocao caccaccaaa     | 900          |
|    | gcccgcagag cggcataagg acgacagcag gggtcttgtg cttcctgggt acaagtacct     | 960          |
| 20 | cggaccette aacggacteg acaaggggga geeggteaac gaggeagaeg eegeggeeet 1(  | 020          |
|    | cgagcacgac aaggcctacg accggcagct cgacagcgga gacaacccgt acctcaagta 10  | 080          |
| 25 | caaccacgcc gacgcagagt ttcaggagcg ccttaaagaa gatacgtctt ttgggggcaa 11  | L <b>4</b> O |
| 25 | ceteggaega geagtettee aggegaaaaa gagggttett gaacetetgg geetggttga 12  | 200          |
|    | ggaacctgtt aagacggctc cgggaaaaaa gaggccggta gagcactctc ctgtggagcc 12  | 60           |
| 30 | agactectee tegggaaceg gaaaageggg ceageggeet geaagaaaaa gattaaattt 13  | 20           |
| 30 | tggtcagact ggagacgcag actccgtacc tgacccccag cctctcggac agccaccagc 13  | 80           |
|    | agoccoctot ggtotgggat otactacaat ggotacaggo agtggogoac caatggoaga 14  | 40           |
| 35 | caataacgag ggtgccgatg gagtgggtaa ttcctcagga aattggcatt gcgattccca 15  | 00           |
| •• |                                                                       | 60           |
|    | caaccacete tacaagcaaa teteeageea ateaggagee ageaaegaea accaetaett 16  | 20           |
| 40 | tggctacage accecetggg ggtattttga etteaacaga ttecaetgee actttteace 16  | 80           |
|    | acgtgactgg camagactca tcamcamcam ctggggattc cggcccmmam gactcmmett 17  | 40           |
|    | caagetettt aatatteaag teaaagaggt caegeagaat gaeggtaega egaegattge 18  | 00           |
| 45 | caataacett accageacgg ttcaggtgtt tactgactcg gagtaceage tecegtacgt 18  | 60           |
|    | cotgggotog gogoatoaag gatgootoco googtttoca goggacgtot toatggtoco 19  | 20           |
|    | acagtatgga tacctcaccc tgaacaacgg gagtcaggcg gtaggacgct cttcctttta 198 | 30           |
| 50 | Ctgcctggag tactttcctt ctcagatgct gcgtactgga aacaactttc agttcagcta 204 | 10           |
|    | cacttttgaa gacgtgcctt tccacagcag ctacgctcac agccagagtc tggatcggct 210 | 00           |
|    | gatgaateet etgategace agtacetgta ttatetgaac aagacacaaa caaatagtgg 216 | 50           |
| 55 | aactetteag cagtetegge tactgtttag ceaagetgga ceaaceaaca tgtetettea 222 | <b>:</b> 0   |
|    |                                                                       |              |

|    | agctaaaaac | tggctgcctg | gaccttgcta | cagacagcag | cgtctgtcaa | aacaggcaaa | 2280              |
|----|------------|------------|------------|------------|------------|------------|-------------------|
|    | cgacaacaac | aacagcaact | ttccctggac | tgcagctaca | aagtatcatc | taaatggccg | 2340              |
| 5  | ggactcgttg | gttaatccag | gaccagctat | ggccagtcac | aaggatgacg | aagaaaagtt | 2400              |
|    | tttccccatg | catggaaccc | tgatatttgg | taaacaagga | acaaatgcca | acgacgcgga | 2460              |
|    | tttggaaaat | gtcatgatta | cagatgaaga | agaaatcagg | gccaccaatc | ccgtggctac | 2520              |
| 10 | ggagcagtac | gggactgtgt | caaataattt | gcaaaactca | aacactggtc | caactactgg | 2580              |
|    | aactgtcaat | cgccaaggag | cgttacctgg | tatggtgtgg | caggatcgag | acgtgtacct | 2640              |
|    | gcagggaccc | atttgggcca | agattcctca | caccgatgga | cactttcatc | cttctccact | 2700              |
| 15 | gatgggaggt | tttggactca | aacacccgcc | tcctcagatc | atgatcaaaa | acactcccgt | 2760              |
|    | tccagccaat | cctcccacaa | acttcagttc | tgccaagttt | gcttctttca | tcacacagta | 2820              |
|    | ttccacggga | caggtcagcg | tggagatcga | gtgggagctg | cagaaggaga | acagcaaacg | 2880 <sup>^</sup> |
| 20 | ctggaatccc | gaaattcagt | acacttccaa | ctacaacaag | tctgttaatg | tggactttac | 2940              |
|    | tgtggacact | aatggtgtgt | attcagagcc | togoccoatt | ggcaccagat | acctgactcg | 300 <b>0</b>      |
|    | taatctgtaa | ttgcttgtta | atcaataaac | cgtttaattc | gtttcagttg | aactttggtc | 30 <b>60</b>      |
| 25 | tctgcgaagg | gcgaa      |            |            |            |            | 3075              |

<210> 27
30 <211> 3128
<212> DNA
<213> new AAV serotype, clone 42.8

<400> 27

.

| gaattcgccc | tttctacggc | tgcgtcaact | ggaccaatga | gaactttccc | ttcaacgatt | 60           |
|------------|------------|------------|------------|------------|------------|--------------|
| gcgtcgacaa | gatggtgatc | tggtgggagg | agggcaagat | gaçggccaag | gtcgtggagt | 120          |
| ccgccaaggc | cattctcggc | ggcagcaagg | tgcgcgtgga | ccaaaagtgc | aagtcttccg | 180          |
| cccagatcga | tcccaccccc | gtgatcgtca | cttccaacac | caacatgtgc | gccgtgattg | 240          |
| acgggaacag | caccaccttc | gagcaccagc | agccgttaca | agaccggatg | ttcaaatttg | 300          |
| aactcacccg | ccgtctggag | cacgactttg | gcaaggtgac | aaagcaggaa | gtcaaagagt | 360          |
| tcttccgctg | ggcgcaggat | cacgtgaccg | aggtggcgca | tgagttctac | gtcagaaagg | 420          |
| gtggagccaa | caagagaccc | gcccccgatg | acgcggataa | aagcgagccc | aagcgggcct | 480          |
| gcccctcagt | cgcggatccá | tcgacgtcag | acgcggaagg | agctccggtg | gactttgccg | 5 <b>4 0</b> |
| acaggtacca | aaacaaatgt | tctcgtcacg | cgggcatgct | tcagatgctg | tttccctgca | 60 <b>o</b>  |
| agacatgcga | gagaatgaat | cagaatttca | acatttgctt | cacgcacggg | accagagact | 660          |
| gttcagaatg | tttccccggc | gtgtcagaat | ctcaaccggt | cgtcagaaag | aggacgtatc | 720          |
| ggaaactctg | tgccattcat | catctgctag | ggcgggctcc | cgagattgct | tgctcqgcct | 780          |

| gcgatctggt   | caacgtggac | ctggatgact  | gtgtttctga   | gcaataaat  | g acttaaacca | 840  |
|--------------|------------|-------------|--------------|------------|--------------|------|
| ggtatggctg   | ccgatggtta | tettecagat  | tggctcgagg   | acaacctct  | tgagggcatt   | 900  |
| cgcgagtggt   | gggacttgaa | acctggagco  | ccgaaaccca   | aagccaacc  | a gcaaaagcag | 960  |
| gacgacggcc   | ggggtctggt | gcttcctggc  | : tacaagtaco | teggaceet  | caacggactc   | 1020 |
| gacaaggggg   | agcccgtcaa | cgcggcggac  | gcagcggccc   | tcgagcacga | a caaggcctac | 1080 |
| gaccagcagc   | tcaaagcggg | tgacaatccg  | tacctgcggt   | ataaccacgo | : cgacgccgag | 1140 |
| tttcaggagc   | gtctgcaaga | agatacgtct  | tttgggggca   | acctcgggcg | g agcagtette | 1200 |
| caggccaaga   | agcgggttct | cgaacctctc  | ggtctggttg   | aggaaggego | : taagacggct | 1260 |
| cctggaaaga   | agagaccggt | agagccatca  | ccccagcgtt   | ctccagacto | ctctacgggc   | 1320 |
| atcggcaaga   | caggccagca | gcccgcgaaa  | aagagactca   | actttgggca | gactggcgac   | 1380 |
| tcagagtcag   | tgcccgaccc | tcaaccaatc  | ggagaacccc   | ccgcaggccc | ctctggtctg   | 1440 |
| ggatctggta   | caatggctgc | aggcggtggc  | gctccaatgg   | cagacaataa | cgaaggcgcc   | 1500 |
| gacggagtgg   | gtagttcctc | aggaaattgg  | cattgcgatt   | ccacatggct | gggcgacaga   | 1560 |
| gtcatcacca   | ccagcacccg | aacctgggcc  | ctccccacct   | acaacaacca | cctctacaag   | 1620 |
| caaatctcca   | acgggacatc | gggaggaagc  | accaacgaca   | acacctactt | cggctacagc   | 1680 |
| accccctggg   | ggtattttga | ctttaacaga  | ttccactgcc   | acttctcacc | acgtgactgg   | 1740 |
| cagcgactca   | tcaacaacaa | ctggggattc  | cggcccaaga   | gactcaactt | caagctcttc   | 1800 |
| aacatccagg   | tcaaggaggt | cacgcagaat  | gaaggcacca   | agaccatcgc | caataacctt   | 1860 |
| accagcacga   | ttcaggtctt | tacggactcg  | gaataccagc   | tecegtacgt | cctcggctct   | 1920 |
| gcgcaccagg   | gctgcctgcc | teegtteeeg. | gcggacgtct   | tcatgattcc | tcagtacggg   | 1980 |
| tacctgactc   | tgaacaacgg | cagtcaggcc  | gtgggccgtt   | cctccttcta | ctgcctggag   | 2040 |
| tactttcctt   | ctcaaatgct | gagaacgggc  | aacaactttg   | agttcagcta | ccagtttgag   | 2100 |
| gacgtgcctt   | ttcacagcag | ctacgcgcac  | agccaaagcc   | tggaccggct | gatgaacccc   | 2160 |
| ctcatcgacc   | agtacctgta | ctacctgtct  | cggactcagt   | ccacgggagg | taccgcagga   | 2220 |
| actcagcagt   | tgctattttc | tcaggccggg  | cctaataaca   | tgtcggctca | ggccaaaaac   | 2280 |
| tggctacccg   | ggccctgcta | ccggcagcaa  | cgcgtctcca   | cgacactgtc | gcaaaataac   | 2340 |
| aacagcaact   | ttgcttggac | cggtgccacc  | aagtatcatc   | tgaatggcag | agactctctg   | 2400 |
| gtaaatcccg   | gtgtcgctat | ggcaacgcac  | aaggacgacg   | aagagcgatt | ttttccatcc   | 2460 |
| ageggagtet   | tgatgtttgg | gaaacaggga  | gctggaaaag   | acaacgtgga | ctatagcagc   | 2520 |
| gttatgctaa ( | ccagtgagga | agaaatcaaa  | accaccaacc   | cagtggccac | agaacagtac   | 2580 |
| ggcgtggtgg   | ccgataacct | gcaacagcaa  | aacgccgctc   | ctattgtagg | ggccgtcaac   | 2640 |
| agtcaaggag ( | ccttacctgg | catggtctgg  | cagaaccggg   | acgtgtacct | gcagggtcct   | 2700 |

|    |                            | •               | EP         | 1 310 571 B1 |            |            |      |
|----|----------------------------|-----------------|------------|--------------|------------|------------|------|
|    | atctgggcca                 | agattcctca      | cacggacggc | aactttcatc   | cttcgccgct | gatgggaggc | 2760 |
|    | tttggactga                 | aacacccgcc      | tcctcagatc | ctgattaaga   | atacacctgt | tcccgcggat | 2820 |
| 5  | cctccaacta                 | ccttcagtca      | agccaagctg | gcgtcgttca   | tcacgcagta | cagcaccgga | 2880 |
|    | caggtcagcg                 | tggaaattga      | atgggagctg | cagaaagaga   | acagcaagcg | ctggaaccca | 2940 |
| *  | gagattcagt                 | atacttccaa      | ctactacaaa | tctacaaatg   | tggactttgc | tgtcaatact | 3000 |
| 10 | gagggtactt                 | attcagagcc      | tcgccccatt | ggcacccgtt   | acctcacccg | taacctgtaa | 3060 |
|    | ttgcctgtta                 | atcaataaac      | cggctaattc | gtttcagttg   | aactttggtc | tctgcgaagg | 3120 |
|    | gcgaattc                   |                 |            |              |            |            | 3128 |
| 15 |                            |                 |            |              |            |            |      |
|    | <210> 28<br><211> 3128     |                 |            | •            |            |            |      |
| 20 | <212> DNA<br><213> new AAV | serotype, clone | 42.15      |              |            |            |      |
|    | <400> 28                   |                 |            |              |            |            |      |
|    |                            |                 |            |              |            | ·          |      |
| 25 |                            |                 |            |              |            |            |      |
|    |                            |                 |            |              |            |            |      |
|    |                            |                 |            |              |            |            |      |
| 30 |                            |                 |            |              | •          |            |      |
|    |                            |                 |            |              |            |            |      |
|    |                            |                 |            |              |            |            |      |

|            | gaaroogaso | cecetacyge | cycyccaacc | ggaccaatga | gaactttcc  | ttcaacgatt | 60   |
|------------|------------|------------|------------|------------|------------|------------|------|
|            | gcgtcgacaa | gatggtgatc | tggtgggagg | agggcaagat | gacggccaag | gtcgtggagt | 120  |
| 5          | ccgccaaggc | cattctcggc | ggcagcaagg | tgcgcgtgga | ccaaaagtgc | aagtcgtccg | 180  |
|            | cccagatcga | CCCCACCCCC | gtgatcgtca | cctccaacac | caacatgtgc | gccgtgattg | 240  |
|            | acgggaacag | caccaccttc | gagcaccagc | agccgttgca | ggaccggatg | ttcaaatttg | 300  |
| 10         | aactcacccg | ccgtctggag | catgactttg | gcaaggtgac | aaagcaggaa | gtcaaagagt | 360  |
|            | tetteegetg | ggcgcaggat | cacgtgaccg | aggtggcgca | tgagttctac | gtcagaaagg | 420  |
|            | gtggagccaa | caagagaccc | gcccccgatg | acgcggataa | aagcgagccc | aagcgggcct | 480  |
| 15         | gcccctcagt | cgcggatcca | tcgacgtcag | acgcggaagg | agctccggtg | gactttgccg | 540  |
|            | acaggtacca | aaacaaatgt | tctcgtcacg | cgggcatgct | tcagatgctg | tttccctgca | 600  |
|            | agacatgcga | gagaatgaat | cagaatttca | acatttgctt | cacgcgcggg | accagagact | 660  |
| 20         | gttcagaatg | tttcccgggc | gtgtcagaat | ctcaaccggt | cgtcagaaag | aggacgtatc | 720  |
|            | ggaaactctg | tgccattcat | catctgctgg | ggcgggctcc | cgagattgct | tgctcggcct | 780  |
|            | gcgatctggt | caacgtggac | ctggatgact | gtgtttctga | gcaataaatg | acttaaacca | 840  |
| 25         | ggtatggctg | ccgatggtta | tcttccagat | tggctcgagg | acaacctctc | tgagggcatt | 900  |
|            | cgcgagtggt | gggacttgaa | acctggagee | ccgaaaccca | aagccaacca | gcaaaagcag | 960  |
|            | gacgacggcc | ggggtctggt | gcttcctggc | tacaagtacc | tcggaccctt | caacggactc | 1020 |
| 30         | gacaaggggg | agcccgtcaa | cgcggcggac | gcagcggccc | tcgagcacga | caaggcctac | 1080 |
|            | gaccagcagc | tcaaagcggg | tgacaatccg | tacctgcggt | ataaccacgc | cgacgccgag | 1140 |
|            | tttcaggagc | gtctgcaaga | agatacgtct | tttgggggca | acctcgggcg | agcagtotto | 1200 |
| 3 <i>5</i> | caggccaaga | agcgggttct | cgaacctctc | gatctgatta | aggaaggcgc | taagacggct | 1260 |

|    | cctggaaag  | a agagaccggt              | agagccatca | a ccccagcgt1 | t ctccagactc | ctctacgggc | 1320 |
|----|------------|---------------------------|------------|--------------|--------------|------------|------|
| _  | atcggcaag  | a caggccagca              | gcccgcgaaa | a aagagactca | actttgggca   | gactggcgac | 1380 |
| 5  | tcagagtca  | g tgcccgaccc              | tcaaccaato | ggagaaccc    | ccgcaggccc   | ctctggtctg | 1440 |
|    | ggatetggt  | a <sub>_</sub> caatggctgc | aggcggtggc | gctccaatgg   | cagacaataa   | cgaaggcgcc | 1500 |
| 40 | gacggagtg  | g gtagttcctc              | aggaaattgg | r cattgcgatt | ccacatggct   | gggcgacaga | 1560 |
| 10 | gtcatcacca | a ccagcacccg              | aacctgggcc | ctccccacct   | acaacaacca   | cctctacaag | 1620 |
|    | caaatctcca | a acgggacatc              | gggaggaagc | accaacgaca   | acacctactt   | cggctacagc | 1680 |
| 15 | acccctggg  | g ggtattttga              | ctttaacaga | ttccactgcc   | acttctcacc   | acgtgactgg | 1740 |
| 75 | cagcgactca | tcaacaacaa                | ctggggattc | cggcccaaga   | gactcaactt   | caagctcttc | 1800 |
|    | aacatccagg | tcaaggaggt                | cacgcagaat | gaaggcacca   | agaccatcgc   | caataacctt | 1860 |
| 20 | accagcacga | ttcaggtctt                | tacggactcg | gaataccagc   | tcccgtacgt   | cctcggctct | 1920 |
| 20 | gcgcaccagg | gctgcccgcc                | tccgttcccg | gcggacgtct   | tcatgattcc   | tcagtacggg | 1980 |
|    | tacctgactc | tgaacaacgg                | cagtcaggcc | gtgggccgtt   | cctccttcta   | ctgcctggag | 2040 |
| 25 | tactttcctt | ctcaaatgcg                | gagaacgggc | aacaactttg   | agttcagcta   | ccagtttgag | 2100 |
|    | gacgtgcctt | ttcacagcag                | ctacgcgcat | agccaaagcc   | tggaccggct   | gatgaacccc | 2160 |
|    | ctcatcgacc | agtacctgta                | ctacctgtct | cggactcagt   | ccacgggagg   | taccgcagga | 2220 |
| 30 | actcagcagt | tgctattttc                | tcaggccggg | cctaataaca   | tgtcggctca   | ggccaaaaac | 2280 |
|    | tggctacccg | ggccctgcta                | ccggcagcaa | cgcgtctcca   | cgacactgtc   | gcaaaataac | 2340 |
|    | aacagcaact | ttgcttggac                | cggtgccacc | aagtatcatc   | tgaatggcag   | agactctctg | 2400 |
| 35 | gtaaatcccg | gtgtcgctat                | ggcaacgcac | aaggacgacg   | aagagcgatt   | ttttccatcc | 2460 |
|    | agcggagtct | tgatgtttgg                | gaaacaggga | gctggaaaag   | acaacgtgga   | ctatagcagc | 2520 |
|    | gttatgctaa | ccagtgagga                | agaaatcaaa | accaccaacc   | cagtggccac   | agaacagtac | 2580 |
| 40 | ggcgtggtgg | ccgataacct                | gcaacagcaa | aacgccgctc   | ctattgtagg   | ggccgtcaac | 2640 |
|    | agtcaaggag | ccttacctgg                | catggtctgg | cagaaccggg   | acgtgtacct   | gcagggtcct | 2700 |
|    | atctgggcca | agattcctca                | cacggacggc | aactttcatc   | cttcgccgct   | gatgggaggc | 2760 |
| 45 | tttggactga | aacacccgcc                | tcctcagatc | ctgattaaga   | atacacctgt   | tcccgcggat | 2820 |
|    | cctccaacta | ccttcagtca                | agccaagctg | gcgtcgttca   | tcacgcagta   | cagcaccgga | 2880 |
|    | caggtcagcg | tggaaattga                | atgggagctg | cagaaagaga   | acagcaagcg   | ctggaaccca | 2940 |
| 50 | gagattcagt | atacttccaa                | ctactacaaa | tctacaaatg   | tggactttgc   | tgtcaatact | 3000 |
|    | gagggtactt | attcagagcc                | tcgccccatt | ggcacccgtt   | acctcacccg   | taacctgtaa | 3060 |
|    | ttgcctgtta | atcaataaac                | cggttaattc | gtttcagttg   | aactttggtc : | tctgcgaagg | 3120 |
| 55 | gcgaattc   |                           |            |              |              |            | 3128 |

<210> 29

<211> 3197 <212> DNA <213> new AAV serotype. clone 42.5b

<400> 29

| gaattcgcc    | c tttctacgg  | c tgcgtcaact | ggaccaatge   | a gaactttccc | ttcaacgatt | 60             |
|--------------|--------------|--------------|--------------|--------------|------------|----------------|
| gcgtcgaca    | a gatggtgat  | c tggtgggagg | agggcaagat   | gacggccaag   | gtcgtggagt | 120            |
| ccgccaagg    | cattctcgg    | ggcagcaagg   | r tgcgcgtgga | ccaaaagtgo   | aagtcgtccg | 180            |
| cccagatcg    | a cccacccc   | gtgatcgtca   | cctccaacac   | caacatgtgo   | gccgtgattg | 240            |
| acgggaaca    | g caccacctto | gagcaccago   | agccgttaca   | agaccggatg   | ttcaaatttg | 300            |
| aactcaccc    | ccgtctggag   | g cacgactttg | gcaaggtgac   | aaagcaggaa   | gtcaaagagt | 360            |
| tetteegetç   | ggcgcaggat   | cacgtgaccg   | aggtggcgca   | tgagttctac   | gtcagaaagg | 420            |
| gtggagccaa   | caegagacco   | gcccccgatg   | acgcggataa   | aagcgagccc   | aagegggeet | 480            |
| gcccctcagt   | cgcggatcca   | tcgacgtcag   | acgcggaagg   | agctccggtg   | gactttgccg | 540            |
| acaggtacca   | aaacaaatgt   | tctcgtcacg   | cgggcatgct   | tcagatgctg   | tttccctgca | 600            |
| agacatgcga   | _gagaatgaat  | cagaatttca   | acatttgctt   | cacgcacggg   | accagagact | 660            |
| gttcagaatg   | tttccccggc   | gtgtcagaat   | ctcaaccggt   | cgtcagaaag   | aggacgtatc | 720            |
| ggaaactctg   | tgccattcat   | catctgctgg   | ggegggetee   | cgagattgct   | tgctcggcct | _ <u>=</u> 780 |
| gcgatctggt   | caacgtggac   | ctggatgact   | gtgtttetga   | gcaataaatg   | acttaaacca | 840            |
| ggtatggctg   | ccgatggtta   | tcttccagat   | tggctcgagg   | acaacctctc   | tgagggcatt | 900            |
| cgcgagtggt   | gggacttgaa   | acctggagcc   | ccgaaaccca   | aagccaacca   | gcaaaagcag | 960            |
| - gacgacggcc | ggggtctggt   | gcttcctggc   | tacaagtacc   | tcggaccctt   | caacggactc | 1020           |
| gacaagggag   | agccggtcaa   | cgaggcagac   | gcegeggece   | tcgagcacga   | caaggcctac | 1080           |
| gacaagcagc   | tcgagcaggg   | ggacaacccg   | tacctcaagt   | acaaccacgc   | cgacgccgag | 1140           |
| tttcaggagc   | gtcttcaaga   | agatacgtct   | tttgggggca   | acctcgggcg   | agcagtcttc | 1200           |
| caggccaaga   | agcgggttct   | cgaacctctc   | ggtctggttg   | aggaaggcgc   | taagacggct | 1260           |
| cctggaaaga   | agagaccggt   | agagccatca   | ccccagcgtt   | ctccagactc   | ctctacgggc | 1320           |
| atcggcaaga   | caggccagca   | gcccgcgaaa   | aagagactca   | actttgggca   | gactggcgac | 1380           |
| tcagagtcag   | tgcccgaccc   | tcaaccaatc   | ggagaacccc   | ccgcaggccc   | ctctggtctg | 1440           |
| ggatctggta   | caatggctgc   | aggcggtggc   | gctccaatgg   | cagacaataa   | cgaaggcgcc | 1500           |
| gacggagtgg   | gtagttcctc   | aggaaattgg   | cattgcgatt   | ccacatggct   | gggcgacaga | 1560           |
| gtcatcacca   | ccagcacccg   | aacctgggcc   | ctccccacct   | acaacaacca   | cctctacaag | 1620 .         |
| caaatctcca   | acgggacatc   | gggaggaagc   | accaacgaca   | acacctactt   | cggctacagc | 1680           |
| accccctggg   | ggtattttga   | ctttaacaga   | ttccactgcc   | acttctcacc   | acgtgactgg | 1740           |

|    | cagegaetea teaacaacaa etggggatte eggeecaaga gaeteaaett caagetette          | 1800 |
|----|----------------------------------------------------------------------------|------|
|    | aacatccagg tcaaggaggt cacgcagaat gaaggcacca agaccatcgc caataacctt          | 1860 |
| 5  | accagcacga ttcaggtott tacggactog gaataccago tocogtacgt cotoggotot          | 1920 |
|    | gegeaccagg getgeetgee teegtteeeg geggaegtet teatgattee teagtaeggg          | 1980 |
|    | tacctgactc tgaacaacgg cagtcaggcc gtgggccgtt cctccttcta ctgcctggag          | 2040 |
| 10 | tactttcctt ctcaaatgct gagaacgggc aacaactttg agttcagcta ccagtttgag          | 2100 |
|    | gacgtgcctt ttcacagcag ctacgcgcac agccaaagcc tggaccggct gatgaacccc          | 2160 |
| ·  | ctcatcgacc agtacctgta ctacctgtct cggactcagt ccacgggagg taccgcagga          | 2220 |
| 15 | actcagcagt tgctattttc tcaggccggg cctaataaca tgtcggctca ggccaaaaac          | 2280 |
|    | tggctacccg ggccctgcta ccggcagcaa cgcgtctcca cgacactgtc gcaaaataac          | 2340 |
|    | aacagcaact ttgcttggac cggtgccacc aagtatcatc tgaatggcag agactctctg          | 2400 |
| 20 | gtaaatcccg gtgtcgctat ggcaacgcac aaggacgacg aagagcgatt ttttccatcc          | 2460 |
|    | agoggagtot tgatgtttgg gaaacaggga gotggaaaag acaaogtgga otatagcago          | 2520 |
|    | gttatgctaa ccagtgagga agaaatcaaa accaccaacc cagtggccac agaacagtac          | 2580 |
| 25 | ggegtggtgg cegataacet geaacageaa aacgeegete etattgtagg ggeegteaac          | 2640 |
|    | agtcaaggag cettacetgg catggtetgg cagaaceggg aegtgtacet geagggteet          | 2700 |
|    | atctgggcca agattcctca cacggacggc aactttcatc cttcgccgct gatgggaggc          | 2760 |
| 30 | tttggactga aacacccgcc tcctcagatc ctgattaaga atacacctgt tcccgcggat          | 2820 |
|    | cetecaacta cetteagtea agecaagetg gegtegttea teaegeagta cageacegga          | 2880 |
| 25 | caggtcageg tggaaattga atgggagetg cagaaagaga acagcaageg etggaaceca          | 2940 |
| 35 | gagattcagt atacttccaa ctactacaaa tctacaaatg tggactttgc tgtcaatact          | 3000 |
|    | gagggtactt attcagagee tegeceeatt ggeaceegtt aceteaceeg taacetgtaa          | 3060 |
| 40 | ttgcctgtta atcaataaac cggttaattc gtttcagttg aactttggtc tctgcgaagg          | 3120 |
| 40 | gcgaattcgt ttaaacctgc aggactagtc cctttagtga gggttaattc tgagcttggc          | 3180 |
|    | gtaatcatgg gtcatag                                                         | 3197 |
| 45 | <210> 30<br><211> 2501<br><212> DNA<br><213> new AAV serotype, clone 42.1b |      |
| 50 | <400> 30                                                                   |      |
|    |                                                                            |      |
|    | gaattegeee tiggetgegt caactggaee aatgagaaet ticcetteaa egattgegte          | 60   |
| 55 | gacaagatgg tgatctggtg ggaggagggc aagatgacgg ccaaggtcgt ggagtccgcc          | 120  |
|    | aaggecatte ateatetget ggggeggget eeegagattg ettgetegge etgegatetg          | 180  |
|    | gtcaacgtgg acctggatga ctgtgtttct gagcaataaa tgacttaaac caggtatggc          | 240  |

|      | tgccgatgg  | t tatcttcca  | g attggctcg           | a ggacaacsto | tctgagggc  | a ttcgcgagtg | 300  |
|------|------------|--------------|-----------------------|--------------|------------|--------------|------|
| =    | gtgggactt  | g agacctgga  | g ccccgaaac           | caaagccaac   | cagcaaaag  | e aggacgacgg | 360  |
| 5    | ccggggtct  | g gtgcttccti | g gctacaagta          | cctcggacco   | ttcaacggad | tcgacaaggg   | 420  |
|      | agagccggt  | aacgaggcag   | acgccgcggc            | cctcgagcac   | gacaaggcct | acgacaagca   | 480  |
| 10   | gctcgagca  | g ggggacaaco | : cgtacctcas          | gtacaaccac   | geegaegee  | g agtttcagga | 540  |
| 10   | gcgtcttca  | a gaagatacgt | : cttt <b>tgg</b> ggg | , caaccteggg | cgagcagtct | tccaggccaa   | 600  |
|      | gaagcgggtt | ctcgaacctc   | teggtetggt            | tgaggaaggc   | gctaagacgg | ctcctggaaa   | 660  |
| . 15 | gaagagacco | atagaatccc   | cegactecte            | cacgggcatc   | ggcaagaaag | gccagcagcc   | 720  |
|      | cgctaaaaag | g agactcaact | ttgggcagac            | tggcgactca   | gagtcagtgo | ccgaccctca   | 780  |
|      | accaatcgga | gaaccccccg   | caggececte            | tggtctggga   | tctggcacaa | tggctgcagg   | 840  |
| 20   | cggtggcgct | ccaatggcag   | acaataacga            | aggcgccgac   | ggagtgggta | gttcctcagg   | 900  |
|      | aaattggcat | tgcgattcca   | catggctggg            | cgacagagtc   | atcaccacca | gcacccgaac   | 960  |
|      | ctgggccctc | cccacctaca   | acaaccacct            | ctacaagcaa   | atctccaacg | ggacatcggg   | 1020 |
| 25   | aggaagcacc | aacgacaaca   | cctacttcgg            | ctacagcacc   | ccstgggggt | attttgactt   | 1080 |
|      | taacagattc | cactgccact   | tctcaccacg            | tgactggcag   | cgactcatca | acaacaactg   | 1140 |
|      | gggattccgg | cccaagagac   | tcaacttcaa            | gctcttcaac   | atccaggtca | aggaggtcac   | 1200 |
| 30   | gcagaatgaa | ggcaccaaga   | ccatcgccaa            | taaccttacc   | agcacgattc | aggtctttac   | 1260 |
|      | ggactcggaa | taccagetee   | cgtacgtcct            | cggctctgcg   | caccagggct | gcctgcctcc   | 1320 |
|      | gttcccggcg | gacgtcttca   | tgattcctca            | gtacgggtac   | ctgactctga | acaacggcag   | 1380 |
| 35   | tcaggccgtg | ggccgttcct   | ccttctactg            | cctggagtac   | tttccttctc | aaatgctgag   | 1440 |
|      | aacgggcaac | aactttgagt   | tcagctacca            | gtttgaggac   | gtgccttttc | acagcagcta   | 1500 |
|      | tgcgcacagc | caaagcctgg   | accggctgat            | gaaccccctc   | atcgaccagt | acctgtacta   | 1560 |
| 40   | cctgtctcgg | actcagtcca   | cgggaggtac            | cgcaggaact   | cagcagttgc | tattttctca   | 1620 |
|      | ggccgggcct | aataacatgt   | cggctcaggc            | caaaaactgg   | ctacccgggc | cctgctaccg   | 1680 |
|      | gcagcaacgc | gtctccacga   | cagtgtcgca            | aaataacaac   | agcaactttg | cttggaccgg   | 1740 |
| 45   | tgccaccaag | tatcatctga   | atggcagaga            | ctctctggta   | aatcccggtg | tcgctatggc   | 1800 |
|      | aacgcacaag | ggcgacgaag   | agcgattttt            | tccatccagc   | ggagtcttga | tgtttgggaa   | 1860 |
|      | acagggagct | ggaaaagaca   | acgtagacta            | tagcagcgtt   | atgctaacca | gtgaggaaga   | 1920 |
| 50   | aatcaaaacc | accaacccag   | tggccacaga            | acagtacggc   | gtggtggccg | ataacctgca   | 1980 |
|      | acagcaaaac | gccgctccta   | ttgtaggggc            | cgtcaacagt   | caaggagcct | tacctggcat   | 2040 |
|      | ggtctggcag | aaccgggacg   | tgtacctgca            | gggtcctate   | tgggccaaga | ttcctcacac   | 2100 |
| 55   | ggacggcaac | tttcatcctt   | cgccgctgat            | gggaggcttt   | ggactgaaac | accegeetee   | 2160 |
|      |            |              |                       |              |            |              |      |

|    |      | tcagatcctg     | attaagaata                            | cacctgttcc | cgcggatcct | ccaactacct | tcagtcaagc | 2220 |
|----|------|----------------|---------------------------------------|------------|------------|------------|------------|------|
| 5  |      | caagctggcg     | tcgttcatca                            | cgcagtacag | caccggacag | gtcagcgtgg | aaattgaatg | 2280 |
| ŭ  |      | ggagctgcag     | aaagagaaca                            | gcaagcgctg | gaacccagag | attcagtata | cttccaacta | 2340 |
|    |      | ctacaaatct     | acaaatgtgg                            | actttgctgt | caatactgag | ggtacttatt | cagagcctcg | 2400 |
| 10 |      | ccccattggc     | acccgttacc                            | tcacccgtaa | cctgtaattg | cctgttaatc | aataaaccgg | 2460 |
|    |      | ttgattcgtt     | tcagttgaac                            | tttggtctca | agggcgaatt | С          |            | 2501 |
|    | -040 | . 24           |                                       |            |            |            |            |      |
| 15 | <210 | > 31<br>> 3113 | •                                     |            |            |            |            |      |
|    |      | > DNA          |                                       |            |            |            |            |      |
|    | -    | = :            | type, cione 42.1                      | 3          |            |            |            |      |
|    |      |                | , , , , , , , , , , , , , , , , , , , |            |            |            |            |      |
|    | <400 | > 31           |                                       |            | •          |            |            |      |
| 20 |      |                |                                       |            |            |            |            |      |
|    |      |                |                                       |            |            |            |            |      |
|    |      |                |                                       |            |            |            |            |      |
|    |      |                |                                       |            |            |            |            |      |
| 25 |      |                |                                       |            |            |            |            |      |
|    |      |                |                                       |            |            |            |            |      |
|    |      |                |                                       |            |            |            |            |      |
|    |      |                |                                       |            |            |            |            |      |
| 30 |      |                |                                       |            |            |            |            |      |

|     | gaacccgccc | . ccccacggc | tgcgtcaact | ggaccaatge | gaactttcc  | ttcaacgatt            | 60   |
|-----|------------|-------------|------------|------------|------------|-----------------------|------|
|     | gcgtcgacaa | gatggtgatc  | tggtgggagg | agggcaagat | gacggccaag | g gtcg <b>t</b> ggagt | 120  |
| 5   | ccgccaaggc | cattctcggc  | ggcagcaagg | tgcgcgtgga | ccaaaagtgo | : aagtcgtccg          | 180  |
|     | cccagatcga | teccacece   | gtgatcgtca | cttccaacac | caacatgtgo | gccgtgattg            | 240  |
|     | acgggaacag | caccaccttc  | gagcaccagc | agccgttaca | agaccggatg | ttcaaatttg            | 300  |
| 10  | aactcacccg | ccgtctggag  | catgactttg | gcaaggtgac | aaagcaggaa | gtcaaagagt            | 360  |
|     | tetteegetg | ggcgcaggat  | cacgtgaccg | aggtggcgca | tgagttctac | gtcagaaagg            | 420  |
|     | gtggagccaa | caagagaccc  | gcccccgatg | acgcggataa | aagcgagccc | aagcgggcct            | 480  |
| 15  | gcccctcagt | cgcggatcca  | tcgacgtcag | acgcggaagg | agctccggtg | gactttgccg            | 540  |
|     | acaggtacca | aaacaaatgt  | tctcgtcacg | cgggcatgct | tcagatgctg | tttccctgca            | 600  |
|     |            |             |            |            |            | accagagact            | 660  |
| 20  |            |             |            |            |            | aggacgtatc            | 720  |
|     |            |             |            |            |            | tgctcggcct            | 780  |
|     |            |             |            |            |            | acttaaacca            | 840  |
| 25  |            |             |            |            |            | tgagggcatt            | 900  |
|     |            |             |            |            |            | gcaaaagcag            | 960  |
| •   |            |             |            |            |            | caacggactc            | 1020 |
| 30  | gacaaggggg | agcccgtcaa  | cgcggcggac | gcagcggccc | tcgagcacga | caaggcctac            | 1080 |
|     | gaccagcagc | tcaaagcggg  | tgacaatccg | tacctgcggt | ataaccacgc | cgacgccgag            | 1140 |
| 25  | tttcaggagc | gtcttcaaga  | agatacgtct | tttgggggca | acctcgggcg | agcagtcttc            | 1200 |
| 35  | caggccaaga | agcgggttct  | cgaacctctc | ggtctggttg | aggaaggcgc | taagacggct            | 1260 |
|     | cctggaaaga | agagacccat  | agaatccccc | gactcctcca | cgggcatcgg | caagaaaggc            | 1320 |
| 40  | cagcagcccg | ctaaaaagaa  | gctcaacttt | gggcagactg | gcgactcaga | gtcagtgccc            | 1380 |
| , • |            |             |            |            |            |                       |      |

| gaccstcaac | : caatcggaga | accccccgca | ggcccctct    | g gtctgggato | tggtacaatg   | 1440 |
|------------|--------------|------------|--------------|--------------|--------------|------|
| gctgcaggcg | gtggcgctcc   | aatggcagad | aataacgaa    | g gcgccgacg  | g agtgggtagt | 1500 |
| tcctcaggaa | attggcattg   | cgattccaca | tggctgggc    | g acagagtcat | caccaccage   | 1560 |
| acccgaacct | gggccctccc   | cacctacaac | aaccacctc1   | acaagcaaat   | : ctccaacggg | 1620 |
| acatcgggag | gaagcaccaa   | cgacaacacc | : tacttcggct | acagcacccc   | ctgggggtat   | 1680 |
| tttgacttta | acagattcca   | ctgccactto | tcaccacgto   | g actggcagcg | actcatcaac   | 1740 |
| aacaactggg | gattccgącc   | caagagactc | aacttcaago   | tottcaacat   | ccaggtcaag   | 1800 |
| gaggtcacgc | agaatgaagg   | caccaagacc | atogocaata   | accttaccag   | cacgattcag   | 1860 |
| gtctttacgg | actcggaata   | ccageteccg | tacgtcctcg   | gctctgcgca   | ccagggctgc   | 1920 |
| ctgcctccgt | tcccggcgga   | cgtcttcatg | attectcagt   | acgggtacct   | gactctgaac   | 1980 |
| aacggcagtc | aggccgtggg   | ccgttcctcc | ttctactgcc   | tggagtactt   | tccttctcaa   | 2040 |
| atgctgagaa | cgggcaacaa   | ctttgagttc | agctaccagt   | ttgaggacgt   | gccttttcac   | 2100 |
| agcagctatg | cgcacagcca   | aagcctggac | cggctgatga   | acccctcat    | cgaccagtac   | 2160 |
| ctgtactacc | tgtctcggac   | tcagtccacg | ggaggtaccg   | caggaactca   | gcagttgcta   | 2220 |
| ttttctcagg | ccgggcctaa   | taacatgtcg | gctcaggcca   | aaaactggct   | acccgggccc   | 2280 |
| tgctaccggc | agcaacgcgt   | ctccacgaca | gtgtcgcaaa   | ataacaacag   | caactttgct   | 2340 |
| tggaccggtg | ccaccaagta   | tcatctgaat | ggcagagact   | ctctggtaaa   | tcccggtgtc   | 2400 |
| gctatggcaa | cgcacaaggg   | cgacgaagag | cgattttttc   | catccagcgg   | agtcttgatg   | 2460 |
| tttgggaaac | agggagctgg   | aaaagacaac | gtggactata   | gcagcgttat   | gctaaccagt   | 2520 |
|            |              |            |              | agtacggcgt   |              | 2580 |
|            |              |            |              | tcaacagtca   |              | 2640 |
|            |              |            |              | gtcctatctg   |              | 2700 |
|            |              |            |              | gaggetttgg   |              | 2760 |
|            |              |            |              | cggatcctcc   |              | 2820 |
| agtcaagcca | agctggcgtc   | gttcatcacg | cagtacagca   | ccggacaggt   | cagcgtggaa   | 2880 |
|            |              |            |              | acccagagat   |              | 2940 |
|            |              |            |              | atactgaggg   |              | 3000 |
|            |              |            | •            | tgtaattgcc   |              | 3060 |
| taaaccggtt | gattcgtttc   | agttgaactt | tggtctctgc   | gaagggcgaa   | ttc          | 3113 |

<210> 32 <211> 3113

<212> DNA

<213> new AAV serotype, clone 42.3a

<400> 32

|    | gaattcgccc tttctacggc tgcgtcaact ggaccaatga gaactttccc ttcaacgatt   | 60     |
|----|---------------------------------------------------------------------|--------|
|    | gcgtcgacaa gatggtgatc tggtgggagg agggcaagat gacggccaag gtcgtggagt   | 120    |
| 5  | ccgccaaggc cattotcggc ggcagcaagg tgcgcgtgga ccaaaagtgc aagtcgtccg   | 180    |
|    | cccagatega teccaeccee gtgategtea ettecaacae caacatgtge geegtgattg   | 240    |
|    | acaggaacag caccaccttc gagcaccagc agccgttaca agaccggatg ttcaaatttg   | 300    |
| 10 | aactcacccg ccgtctggag catgactttg gcaaggtgac aaagcaggaa gtcaaagagt   | 360    |
|    | tottocgotg ggogcaggat caogtgacog aggtggogca tgagttotac gtcagaaagg   | 420    |
|    | gtggagccaa caagagaccc gcccccgatg acgcggataa aagcgagccc aagcgggcct   | 480    |
| 15 | gcccctcagt cgcggatcca tcgacgtcag acgcggaagg agctccggtg gactttgccg   | 540    |
|    | acaggtacca aaacaaatgt totogtoacg cgggcatgot toagatgotg ottooctgca   | 600    |
|    | agacatgcga gagaatgaat cagaatttca gcatttgctt cacgcacggg accagagact   | 660    |
| 20 | gttcagaatg tttccccggc gtgtcagaat ctcaaccggt cgtcagaaag aggacgtatc   | 720    |
|    | ggaaactetg tgecatteat catetgetgg ggegggetee egagattget tgeteggeet   | 780    |
|    | gcgatctggt caacgtggac ctggatgact gtgtttctga gcaataaatg acttaaacca   | 840    |
| 25 | ggtatggctg cegatggtca tettecagat tggetegagg acaaeetete tgagggcatt   | 900    |
|    | cgcgagtggt gggacttgaa acctggagct ccgaaaccca aagccaacca gcaaaagcag   | 960    |
|    | gacgacggcc ggggtctggt gcttcctggc tacaagtacc tcggaccctt caacggactc   | 1020   |
| 30 | gacaaggggg agcccgtcaa cgcggcggac gcagcggccc tcgagcacga caaggcctac   | 1080   |
|    | gaccagcagc tcaaagcggg tgacaatccg tacctgcggt ataaccacgc cgacgccgag   | 1140   |
|    | tttcaggage gtettcaaga agatacgtet tttgggggca acetegggeg agcagtette   | 1200   |
| 35 | caggocaaga agogggttot ogaacototo ggtotggttg aggaaggogo taagaoggot   | 1260   |
|    | cctggaaaga agagacccat agaatccccc gactcctcca cgggcatcgg caagaaaggc   | 1320   |
|    | cagcageceg ctaaaaagaa geteaaettt gggeagaetg gegaeteaga gteagtgeee   | 1380   |
| 40 | gacceteaac caateggaga acceeeegea ggeceetetg gtetgggate tggtacaatg   | 1440   |
| •  | gctgcaggcg gtggcgctcc aatggcagac aataacgaag gcgccgacgg agtgggtagt ] | 1500   |
|    | tectcaggaa attggcattg egattecaca tagetgggeg acagagteat caccaccage l | 1560   |
| 45 | accegaacet gggccetece cacetacaac aaccacetet acaagcaaat etecaacggg l | L 62 O |
|    | acategggag gaagcaccaa egacaacace tacttegget acagcaccee etgggggtat l | 1680   |
|    | tttgacttta acagattcca ctgccacttc tcaccacgtg actggcagcg actcatcaac l | 740    |
| 50 | aacagctggg gattccggcc caagagactc aacttcaagc tcttcaacat ccaggtcaag l | .800   |
|    | gaggtcacgc agaatgaagg caccaagacc atcgccaata accttaccag cacgattcag l | .860   |
|    | gtctttacgg actcggaata ccagctcccg tacgtcctcg gctctgcgca ccagggctgc l | .920   |

|    | ctgcctccgt | tcccggcgga | cgtcttcatg | attoctcagt          | acgggtacct | gactctgaac | 1980 |
|----|------------|------------|------------|---------------------|------------|------------|------|
|    | aacggcagtc | aggccgtggg | ccgttcctcc | ttctactgcc          | tggagtactt | tccttctcaa | 2040 |
| 5  | atgctgagaa | cgggcaacaa | ctttgagttc | agctaccagt          | ttgaggacgt | gccttttcac | 2100 |
|    | agcagctacg | cgcacagcca | aagcctggac | cggctgatga          | accccctcat | cgaccagtac | 2160 |
| 10 | ctgtactacc | tgtctcggac | tcagtccacg | g <b>g</b> aggtaccg | caggaactca | gcagttgcta | 2220 |
| 10 | ttttctcagg | ccgggcctaa | taacatgtcg | gctcaggcca          | aaaactggct | accegggeee | 2280 |
|    | tgctaccggc | agcaacgcgt | ctccacgaca | ctgtcgcaaa          | ataacaacag | caactttgct | 2340 |
| 15 | tggaccggtg | ccaccaagta | tcatctgaat | ggcagagact          | ctctggtaaa | teceggtgte | 2400 |
| 15 | gctatggcaa | cgcacaagga | cgacgaagag | cgattttttc          | catccagcgg | agtcttgatg | 2460 |
|    | tttgggaaac | agggagctgg | aaaagacaac | gtggactata          | gcagcgttat | gctaaccagt | 2520 |
| 20 | gaggaagaaa | tcaaaaccac | caacccagtg | gccacagaac          | agtacggcgt | ggtggccgat | 2580 |
|    | aacctgcaac | agcaaaacgc | cgctcctatt | gtaggggccg          | tcaacagtca | aggagcctta | 2640 |
|    | cctggcatgg | tctggcagaa | ccgggacgtg | tacctgcagg          | gtcctatctg | ggccaagatt | 2700 |
| 25 | cctcacacgg | acggcaactt | tcatccttcg | ccgctgatgg          | gaggctttgg | actgaaacac | 2760 |
|    | ccgcctcctc | agatcctgat | taagaataca | cctgttcccg          | cggatcctcc | aactaccttc | 2820 |
|    | agtcaagcca | agctggcgtc | gttcatcacg | cagtacagca          | ccggacaggt | cagcgtggaa | 2880 |
| 30 | attgaatggg | agctgcagaa | agagaacagc | aagcgctgga          | acccagagat | tcagtatact | 2940 |
|    | tccaactact | acaaatctac | aaatgtggac | tttgctgtca          | atactgaggg | tacttattca | 3000 |
|    | gagcctcgcc | ccattggcac | ccgttacctc | acccgtaacc          | tgtaattgcc | tgttaatcaa | 3060 |
| 35 | taaaccggtt | aattcgtttc | agttgaactt | tggtctctgc          | gaagggcgaa | ttc        | 3113 |

<210> 33

<211> 2504

<212> DNA

<213> new AAV serotype, clone 42.4

<400> 33

50

45

40

| gaattcgccc | tttctacggc | tgcgtcaact | ggaccaatga          | gaactttccc | ttcaacgatt | 60  |
|------------|------------|------------|---------------------|------------|------------|-----|
| gcgtcgacaa | gatggtgatc | tggtgggagg | agggcaagat          | gacggccaag | gtcgtggagt | 120 |
| ccgccaaggc | cattcatcat | ctgctggggc | gggctcccga          | gattgcttgc | tcggcctgcg | 180 |
| atctggtcaa | cgtggacctg | gatgactgtg | tttctgagca          | ataaatgact | taaaccaggt | 240 |
| atggctgccg | atggttatct | tccagattgg | ctcgaggaca          | acctctctga | gggcattcgc | 300 |
| gagtggtggg | acttgaaacc | tggagccccg | aaacccaaag          | ccaaccagca | aaagcaggac | 360 |
| gacggccggg | gtctggtgct | tcctggctac | aa <b>g</b> tacctcg | gacccttcaa | cggactcgac | 420 |
| aagggagagc | cggtcaacga | ggcagacgcc | gcggccctcg          | agcacgacaa | ggcctacgac | 480 |
| aagcagctcg | agcagggga  | caacccgtac | ctcaagtaca          | accacgccga | cgccgagttt | 540 |

| caggagcgt  | c ttcaagaag  | a tacgtettt  | gggggcaaco   | tcgggcgag  | agtcttccag      | 600  |
|------------|--------------|--------------|--------------|------------|-----------------|------|
| gccaagaag  | c gggttctcg  | a acctctcggt | ctggttgagg   | aaggcgcta  | a gacggctcct    | 660  |
| ggaaagaag  | a gacccatag  | a atcccccgad | tcctccacgo   | gcatcggcaa | a gaaaggccag    | 720  |
| cagcccgct  | a aaaagaagc  | t caactttgg  | g cagactggcg | actcagagto | agtgcccgac      | 780  |
| cctcaacca  | a tcggagaaco | ccccgcaggo   | ccctctggtc   | tgggatctgg | ,<br>tacaatggct | 840  |
| gcaggcggt  | g gcgctccaat | ggcagacaat   | aacgaaggcg   | ccgacggagt | gggtaatgcc      | 900  |
| tccggaaatt | ggcattgcga   | a ttccacatgg | ctgggcgaca   | gagtcatcac | caccagcacc      | 960  |
| cgcacctggg | ccctgcccac   | ctacaacaac   | cacctctaca   | agcagatato | aagtcagagc      | 1020 |
| ggggctacca | acgacaacca   | cttcttcggc   | tacagcaccc   | cctggggcta | ttttgacttc      | 1080 |
| aacagattco | actgccactt   | ctcatcacgt   | gactggcagc   | gactcatcaa | caacaactgg      | 1140 |
| ggattccggc | ccaagagact   | caacttcaag   | ctcttcaaca   | tccaggtcaa | ggaggtcacg      | 1200 |
| cagaatgaag | gcaccaagac   | catcgccaat   | aaccttacca   | gcacgattca | ggtctttacg      | 1260 |
| gactcggaat | accggctccc   | gtacgtcctc   | ggctctgcgc   | accagggctg | cctgcctccg      | 1320 |
| ttcccggcgg | acgtcttcat   | gattcctcag   | tacgggtacc   | tgactctgaa | caacggcagt      | 1380 |
| caggccgtgg | gccgttcctc   | cttctactgc   | ctggagtact   | ttccttctca | aatgctgaga      | 1440 |
| acgggcaaca | actttgagtt   | cagctaccag   | tttgaggacg   | tgccttttca | cagcagctac      | 1500 |
| gcgcacagcc | aaagcctgga   | ccggctgatg   | aaccccctca   | tcgaccagta | cctgtactac      | 1560 |
| ctgtctcgga | ctcagtccac   | gggaggtacc   | gcaggaactc   | agcagttgct | attttctcag      | 1620 |
| gccgggccta | ataacatgtc   | ggctcaggcc   | aaaaactggc   | tacccgggcc | ctgctaccgg      | 1680 |
| cagcaacgcg | tctccacgac   | actgtcgcaa   | aataacaaca   | gcaactttgc | ttggaccggt      | 1740 |
| gccaccaagt | atcatctgaa   | tggcagagac   | tctctggtaa   | atcccggtgt | cgctatggca      | 1800 |
| acgcacaagg | acgacgaaga   | gcgattttt    | ccatccagcg   | gagtcttgat | gtttgggaaa      | 1860 |
| cagggagctg | gaaaagacaa   | cgtggactat   | agcagcgtta   | tgctaaccag | tgaggaagaa      | 1920 |
| atcaaaacca | ccaacccagt   | ggccacagaa   | cagtacggcg   | tggtggccga | taacctgcaa      | 1980 |
| cagcaaaacg | ccgctcctat   | tgtaggggcc   | gtcaacagtc   | aaggagcctt | acctggcatg      | 2040 |
| gtctggcaga | accgggacgt   | gtacctgcag   | ggtcctatct   | gggccaagat | tcctcacacg      | 2100 |
| gacggcaact | ttcatccttc   | gccgctgatg   | ggaggctttg   | gactgaaaca | cccgcctcct      | 2160 |
| cagatcctga | ttaagaatac   | acctgttccc   | gcggatcctc   | caactacctt | cagtcaagcc      | 2220 |
| aagccggcgt | cgttcatcac   | gcagtacagc   | accggacagg   | tcagcgtgga | aattgaatgg      | 2280 |
| gagctgcaga | aagagaacag   | caagcgctgg   | aacccagaga   | ttcagtatac | ttccaactac      | 2340 |
| tacaaatcta | caaatgtgga   | ctttgctgtc   | aatactgagg   | gtacttattc | agagcctcgc      | 2400 |
| cccattggca | cccgttacct   | cacccgtaac   | ctgtaattgc   | ctgttaatca | ataaaccggt      | 2460 |

|    | EP 1 310 571 B1                                  |      |
|----|--------------------------------------------------|------|
|    | taattogttt cagttgaact ttggtototg cgaagggoga atto | 2504 |
| 5  |                                                  |      |
|    | <210> 34                                         |      |
|    | <211> 3106                                       |      |
|    | <212> DNA                                        |      |
| 10 | <213> new AAV serotype, clone 42.5a              |      |
|    | <400> 34                                         |      |
|    |                                                  |      |
|    |                                                  |      |
|    |                                                  |      |
| 15 |                                                  |      |
|    |                                                  |      |
|    |                                                  |      |
|    |                                                  |      |
| 20 |                                                  |      |
|    |                                                  |      |
| ,  |                                                  |      |
|    |                                                  |      |

|    | gaattcgccd | ttctacggct   | gcgtcaacto | gaccaatgag   | aactttccc  | tcaacgattg   | 60   |
|----|------------|--------------|------------|--------------|------------|--------------|------|
|    | cgtcgacaa  | g atggtgatct | ggtgggagga | gggcaagat    | acggccaag  | g togtggagto | 120  |
| 5  | cgccaaggc  | attctcggcg   | gcagcaaggt | gcgcgtggac   | caaaagtgc  | agtcgtccgc   | 180  |
|    | ccagatcgac | ccacccccg    | tgatcgtcac | ctcsaacaco   | aacatgtgc  | ccgtgattga   | 240  |
|    | cgggaacagc | accaccttcg   | agcaccagca | gccgttgcag   | gaccggatgt | tcaaatttga   | 300  |
| 10 | actcacccgc | : cgtctggagc | atgactttgg | caaggcgaca   | aagcaggaag | tcaaagagtt   | 360  |
|    | cttccgctgg | gcgcaggate   | acgtgaccga | ggtggcgcat   | gagttctacg | tcagaaaggg   | 420  |
|    | tggagccaac | : aagagacccg | ccccgatga  | cgcggataaa   | agcgagccca | agcgggcccg   | 480  |
| 15 | cccctcagtc | gcggatccat   | cgacgtcaga | cgcggaagga   | gctccggtgg | actttgccga   | 540  |
|    | caggtaccaa | aacaaatgtt   | ctcgtcacgc | gggcatgctt   | cagatgctgt | ttccctgcaa   | 600  |
|    | aacatgcgag | agaatgaatc   | agaatttcaa | catttgcttc   | acgcacggga | ccagagactg   | 660  |
| 20 | ttcagaatgt | ttccccggcg   | tgtcagaatc | tcaaccggtc   | gtcagaaaga | ggacgtatcg   | 720  |
|    | gaaactctgt | gccattcatc   | atctgctggg | gcgggctccc   | gagattgctt | gctcggcctg   | 780  |
|    | cgatctggtc | aacgtggacc   | tggatgactg | tgtttctgag   | caataaatga | cttaaaccag   | 840  |
| 25 | gtatggctgc | cgatggttat   | cttccagatt | ggctcgagga   | caacctctct | gagggcattc   | 900  |
|    | gcgagtggtg | ggacttgaaa   | cctggagccc | cgaaacccaa   | agccaaccag | caaaagcagg   | 960  |
|    | acgacggccg | gggtctggtg   | cttcctggct | acaagtacct   | cggacccttc | aacggactcg   | 1020 |
| 30 | acaagggaga | gccggtcaac   | gaggcagacg | ccgcggccct   | cgagcacgac | aaggcctacg   | 1080 |
|    | acaagcagct | cgagcagggg   | gacaacccgt | acctcaagta   | caaccacgcc | gacgccgagt   | 1140 |
|    | ttcaggagcg | tcttcaagaa   | gatacgtctt | ttgggggcaa   | cctcgggcga | gcagtcttcc   | 1200 |
| 35 | gggccaagaa | gcgggttctc   | gaacctctcg | gtctggttga   | ggaaggcgct | aagacggctc   | 1260 |
|    | ctggaaagaa | gagacccata   | gaatcccccg | actectecae   | gggcatcggc | aagaaaggcc   | 1320 |
|    | agcagcccgc | taaaaagaag   | ctcaactttg | ggcagactgg   | cgactcagag | tcagtgcccg   | 1380 |
| 40 | accccaacc  | tctcggagaa   | cctcccgccg | cgccctcagg   | tctgggatct | ggtacaetgg   | 1440 |
| •  | ctgcaggcgg | tggcgcacca   | atggcagaca | ataacgaagg : | cgcčgacgga | gtgggtaatg   | 1500 |
|    |            |              | gattccacat |              |            |              | 1560 |
| 45 |            |              | acctacaaca |              |            |              | 1620 |
|    | gcggggctac | caacgacaac   | cacttcttcg | gctacagcac   | cccctggggc | tattttgact   | 1680 |

|    | ccaacagact | ccactgcca | t ttctcacca | c grgactggc  | a gcgactcat | c aacaacaacc | 1740         |
|----|------------|-----------|-------------|--------------|-------------|--------------|--------------|
| 5  | ggggattccq | gcccagaaa | g ctgcggttc | a agttgttcaa | a catccaggt | c aaggaggtca | 1800         |
|    | Cgacgaacga | cggcgttac | g accateget | a ataaccttad | cagcacgat   | t caggtcttct | 1860         |
|    |            |           | `           |              |             | tgcctccctc   | 1920         |
| 10 |            |           |             |              |             | a aacaacggca | 1980         |
|    |            |           |             |              |             | cagatgctga   | 2040         |
|    |            | •         |             |              |             | cacagcagct   | 2100         |
| 15 |            |           |             |              |             | tacctgtact   | 2160         |
|    |            |           |             |              |             | ctattttctc   | 2220         |
|    |            |           |             |              |             | ccctgctacc   | 2280         |
| 20 |            |           |             |              |             | gcttggaccg   | 2340         |
|    |            |           |             |              |             | gtcgctatgg   | 2400         |
|    |            |           |             |              |             | atgtttggga   | 2460         |
| 25 |            |           |             |              |             | agtgaggaag   | 2520         |
|    |            |           | attgtagggg  |              |             | gataacctgc   | 2580         |
|    | tggcctggca |           |             |              |             |              | 2640         |
| 30 |            |           | tegeegetga  |              |             |              | 27 00        |
|    | ctcagatect |           |             |              |             |              | 2760<br>2820 |
|    | ccaagctggc |           |             |              |             |              | 2880         |
| 35 | gggagctgca |           |             |              |             |              | 2940         |
| -  | actacaaatc |           | •           |              |             |              | 3000         |
| 40 | gccccattgg |           |             |              |             |              | 3060         |
| 70 | gttaattcgt |           |             |              |             | _            | 3106         |

<210> 35

<211> 2489

<212> DNA

<213> new AAV serotype, clone 42.10

<400> 35

55

45

|   |            |            | EP 1       | 310 571 B1 |            |            |     |
|---|------------|------------|------------|------------|------------|------------|-----|
|   | gaattcgccc | tttctacggc | tgcgtcaact | ggaccaatga | gaactttccc | ttcaacgatt | 60  |
|   | gcgtcgacaa | gatggtgatc | tggtgggagg | agggcaagat | gacggccaag | gtcgtgaagt | 120 |
| 5 | ccgccaaggc | cattcatcat | ctgctggggc | gggctcccga | gattgcttgc | teggeetgeg | 180 |
|   | atctggtcaa | cgtggacctg | gatgactgtg | tttctgagca | ataaatgact | taaaccaggt | 240 |
|   | atggctgccg | atggttatct | tccagattgg | ctcgaggaca | acctctctga | gggcattcgc | 300 |
| 0 |            |            |            |            |            |            |     |
|   |            |            |            |            |            |            |     |
|   |            |            |            |            |            |            |     |
| 5 |            |            |            |            |            |            |     |

|   | gagtggtggg | acttgaaaco | tggagccccg | aaacccaaag | ccaaccagc  | a aaagcaggac | 3 60 |
|---|------------|------------|------------|------------|------------|--------------|------|
|   | gacggccggg | gtetggtget | toctggctac | aagtacctcg | gaccettca  | a cggactcgac | 420  |
|   | aagggagagc | cggtcaacga | ggcagacgcc | gcggccctcg | agcacgacaa | ggcctacgac   | 480  |
|   | aagcagctcg | agcagggga  | caacccgtac | ctcaagtaca | accacgccga | cgccgagttt   | 540  |
|   | caggagcgtc | ttcaagaaga | tacgtctttt | gggggcaacc | tcgggcgagc | agtcttccag   | 600  |
|   | gccaagaagc | gggttctcga | acctctcggt | ctggttgagg | aaggcgctaa | gacggctcct   | 660  |
|   | ggaaagaaga | gacccataga | atcccccgac | tcctccacgg | gcatcggcag | gaaaggccag   | 720  |
|   | cagcccgcta | aaaagaagct | caactttggg | cagactggcg | actcagagto | agtgcccgac   | 780  |
|   | cctcaaccaa | tcggagaacc | ccccgcaggc | ccctctggtc | tgggatctgg | tacaatggct   | 840  |
|   | gcaggcggtg | gcgctccaat | ggcagacaat | aacgaaggcg | ccgacggagt | gggtaatgcc   | 900  |
|   | tccggaaatt | ggcattgcga | ttccacatgg | ctgggcgaca | gagtcatcac | caccagcacc   | 960  |
|   | cgcacctggg | ccctgcccac | ctacaacaac | cacctctaca | agcagatatc | aagtcagagc   | 1020 |
|   | ggggctacca | acgacaacca | cttcttcggc | tacagcaccc | cctggggcta | ttttgacttc   | 1080 |
|   | aacagattcc | actgccactt | ctcaccacgt | gactggcagc | gactcatcaa | caacaactgg   | 1140 |
|   | ggattccggc | ccagaaagct | gcggttcaag | ttgttcaaca | tccaggtcaa | ggaggtcacg   | 1200 |
|   | acgaacgacg | gcgttacgac | categecaat | aaccttacca | gcacgattca | ggtcttctcg   | 1260 |
|   | gactcggagt | accaactgcc | gtacgtcctc | ggctctgcgc | accagggctg | cctccctccg   | 1320 |
|   | ttccctgcgg | acgtgttcat | gattcctcag | tacggatatc | tgactctaaa | caacggcagt   | 1380 |
|   | cagtctgtgg | gacgttcctc | cttctactgc | ctggagtact | ttccttctca | gatgctgaga   | 1440 |
|   | acgggcaata | actttgaatt | cagctacacs | tttgaggaag | tgcctttcca | cagcagctat   | 1500 |
|   | gcgcacagcc | agagcctgga | ccggctgatg | aatcccctca | tcgaccagta | cctgtactac   | 1560 |
| • | ctggcccgga | cccagagcac | tacggggtcc | acaagggagc | tgcagttcca | tcaggctggg   | 1620 |
|   | CCCAACACCA | tggccgagca | atcasagasc | tggctgcccg | gaccctgtta | tcggcagcag   | 1680 |
|   | agactgtcaa | aaaacataga | cagcaacaac | aacagtaact | ttgcctggac | cggggccact   | 1740 |
|   | aaataccatc | tgaatggtag | aaattcatta | accaacccgg | gcgtagccat | ggccaccaac   | 1800 |
|   | aaggacgacg | aggaccagtt | ctttcccatc | aacggagtgc | tggtttttgg | caaaacgggg   | 1860 |
|   | gctgccaaca | agacaacgct | ggaaaacgtg | ctaatgacca | gcgaggagga | gatcaaaacc   | 1920 |
|   | accaateceg | tggctacaga | agaatacggt | gtggtctcca | gcaacctgca | atcgtctacg   | 1980 |
|   | gccggacccc | agacacagac | tgtcaacagc | cagggggctc | tgcccggcat | ggtctggcag   | 2040 |
|   | aaccgggacg | tgtacctgca | gggtcccatc | tgggccaaaa | ttcctcacac | ggacggcaac   | 2100 |
|   | tttcacccgt | ctcccctgat | gggcggattt | ggactcaáac | accegeetee | tcaaattctc   | 2160 |
|   | atcassasca | cccggtacc  | tgctaatcct | ccagaggtgt | ttactcctgc | caagtttgcc   | 2220 |

|    |                         |                 | Cr I.      | 510 5/1 B1 |            |            |      |
|----|-------------------------|-----------------|------------|------------|------------|------------|------|
|    | +<=+++++                |                 |            | _          |            |            |      |
|    |                         |                 |            |            |            | ggaactgcag | 2280 |
|    | aaagaaaaca              | gcaaacgctg      | gaatccagag | attcagtaca | cctcaaatta | tgccaagtct | 2340 |
| 5  | aataatgtgg              | aatttgctgt      | caacaacgaa | ggggtttata | ctgagcctcg | ccccattggc | 2400 |
|    | acccgttacc              | tcacccgtaa      | cctgtaattg | cctgttaatc | aataaaccgg | ttaattogtt | 2460 |
|    | tcagttgaac              | tttggtcaag      | ggcgaattc  |            |            | ,          | 2489 |
| 10 |                         |                 |            |            |            |            |      |
|    | <210> 36                |                 |            | •          | •          |            |      |
|    | <211> 2495              |                 |            |            |            |            |      |
|    | <217> 2495<br><212> DNA |                 |            |            |            |            |      |
| 15 | <213> new AAV ser       | rotuno ciono 42 | 26         |            |            |            |      |
|    | 12 132 Hew AAV Sei      | otype, done 42. | 30         |            |            |            |      |
|    | <400> 36                |                 |            |            |            |            |      |
|    |                         |                 |            |            |            |            |      |
| 20 |                         |                 |            |            |            |            |      |
|    |                         |                 |            |            |            |            |      |
|    |                         |                 |            |            |            |            |      |
|    |                         |                 |            |            |            |            |      |
| 25 |                         |                 |            |            |            |            |      |
|    | 1.7.                    | •               |            |            |            |            |      |
|    |                         |                 |            |            |            |            |      |
|    |                         |                 |            |            |            |            |      |

|    | gaarragaa  | ccccacggc    | cgcgccaact | . agaccaatg | a gaacttteet | ttcaacgatt | 6    |
|----|------------|--------------|------------|-------------|--------------|------------|------|
|    | gcgtcgacaa | gatggtgatc   | tggtgggagg | g agggcaaga | t gacggccaag | gtcgtggagt | 12   |
| 5  | ccgccaaggc | cattcatcat   | ctgctgggg  | gggctcccg   | a gattgcttgc | teggeetgeg | 18   |
|    | atctggtcaa | cgtggacctg   | gatgactgtg | tttctgagce  | a ataaatgact | taaaccaggt | 24   |
|    | atggctgccg | atggttatct   | tccagattgg | ctcgaggaca  | acctctctga   | gggcattcgc | 300  |
| 10 | gagtggtggg | acttgaaacc   | tggagccccg | asacccaaag  | , ccaaccagca | aaagcaggac | 360  |
|    | gacggccggg | gtctggtgct   | tcctggctac | aagtacctcg  | gacccttcaa   | cggactcgac | 420  |
|    | aagggagagc | cggtcaacga   | ggcagacgcc | geggeeeteg  | agcacgacaa   | ggcctacgac | 480  |
| 15 | aagcagctcg | agcaggggga   | caacccgtac | ctcaagtaca  | accacgccga   | cgccgagttt | 540  |
|    | caggagcgtc | ttcaagaaga   | tacgtctttt | gggggcaacc  | tcgggcgagc   | agtcttccag | 600  |
|    | gccaagaagc | gggttctcga   | acctctcggt | ctggttgagg  | aaggcgctaa   | gacggctcct | 660  |
| 20 | ggaaagaaga | gacccataga   | atcccccgac | tectecaegg  | gcatcggcaa   | gaaaggccag | 720  |
|    | cagcccgcta | aaaagaagct   | caactttggg | cagactggcg  | actcagagtc   | agtgcccgac | 78 0 |
|    | cctcaaccaa | tcggagaacc   | ccccgcaggc | ccctctggtc  | tgggatctgg   | tacaatggct | 840  |
| 25 | gcaggcggtg | gcgctccaat   | ggcagacaat | aacgaaggcg  | ccgacggagt   | gggtaatgcc | 900  |
|    | tccggaaatt | ggcattgcga   | ttccacatgg | ctgggcgaca  | gagtcatcac   | caccagcacc | 960  |
|    | cgcacctggg | ccctgcccac   | ctacaacaac | cacctctaca  | agcagatatc   | aagtcagagc | 1020 |
| 30 | ggggctacca | acgacaacca   | cttcttcggc | tacagcaccc  | cctggggcta   | ttttgacttc | 1080 |
|    | aacagattcc | actgccactt   | ctcaccacgt | gactggcagc  | gactcatcaa   | caacaactgg | 1140 |
|    | ggattccggc | ccagaaagct   | gcggttcaag | ttgttcaaca  | tccaggtcaa   | ggaggtcacg | 1200 |
| 35 | acgaacgacg | gcgttacgac   | catcgctaat | aaccttacca  | gcacgattca   | ggtcttctcg | 1260 |
|    | gactcggagt | accaactgcc   | gtacgtcctc | ggctctgcgc  | accagggctg   | cctccctccg | 1320 |
|    | ttccctgcgg | acgtgttcat   | gattcctcag | tacggatatc  | tgactctaaa   | caacggcagt | 1380 |
| 40 | cantetatan | gacgttcctc . | cttctbataa | *****       |              |            |      |

acgggcaata actttgaatt cagctacacc tttgaggaag tgcctttcca cagcagctat 1500

|           | gcgcacagcc    | agagcctgga      | ccggctgatg | aatcccctce | tcgaccagta | cctgtactac | 1560  |
|-----------|---------------|-----------------|------------|------------|------------|------------|-------|
| 5         | ctggcccgga    | cccagagcac      | tacggggtcc | acaagggagc | tgcagttcca | tcaggctggg | 1620  |
|           | cccaacacca    | tggccgagca      | atcaaagaac | tggctgcccg | gaccctgtta | teggeageag | 1680  |
|           | agactgtcaa    | äaaacataga      | cagcaacaac | accagtaact | ttgcctggac | cggggccact | 1740  |
| 10        | aaataccatc    | tgaatggtag      | aaattcatta | accaacccgg | gcgtagccat | ggccaccaac | 1800  |
|           | aaggacgacg    | aggaccagtt      | ctttcccatc | aacggagtgc | tggtttttgg | caaaacgggg | 1860  |
|           | gctgccaaca    | agacaacgct      | ggaaaacgtg | ctaatgacca | gcgaggagga | gatcaaaacc | 1920  |
| 15        | accaatcccg    | tggctacaga      | acagtacggt | gtggtctcca | gcaacctgca | atcgtctacg | 1980  |
|           | gccggacccc    | agacacagac      | tgtcaacage | cagggggctc | tgcccggcat | ggtctggcag | 2040  |
|           | aaccgggacg    | tgtacctgca      | gggtcccatc | tgggccaaaa | ttcctcacac | ggacggcaac | 2100  |
| 20        | tttcacccgt    | ctcccctgat      | gggcggattt | ggactcaaac | acccgcctcc | tcaaattctc | 2160  |
|           | atcaaaaaca    | ccccggtacc      | tgctaatcct | ccagaggtgt | ttactcctgc | caagtttgcc | 2220  |
|           | tcatttatca    | cgcagtacag      | caccggccag | gtcagcgtgg | agatcgagtg | ggaactgcag | 2280  |
| 25        | aaagaaaaca    | gcaaacgctg      | gaatccagag | attcagtaca | cctcaaatta | tgccaagtct | 2340  |
|           | aataatgtgg    | aatttgctgt      | caacaacgaa | ggggtttata | ctgagcctcg | ccccattggc | 2400  |
| ••        | acccgttacc    | tcacccgtaa      | cctgtaattg | cctgttaatc | aataaaccgg | ttaattcgtt | 2460  |
| 30        | tcagttgaac    | tttggtctct      | gcgaagggcg | aattc      |            |            | 249.5 |
|           | <210> 37      |                 |            |            |            |            |       |
|           | <211> 3098    |                 |            |            |            |            |       |
| <i>35</i> | <212> DNA     |                 |            |            |            |            |       |
|           | <213> new AAV | serotype, clone | 42.11      |            |            |            |       |
|           | <400> 37      | ,               |            |            |            |            |       |
| 40        | gaattcgccc    | tttctacggc      | tgcgtcaact | ggaccaatga | gaactttccc | ttcaacgatt | 60    |
|           | gcgtcgacaa    | gatggtgatc      | tggtgggagg | agggcaagat | gacggccaag | gtcgtggagt | 120   |
|           | ccgccaaggc    | cattctcggc      | ggcagcaagg | tgcgcgtgga | ccaaaagtgc | aagtetteeg | 180   |
| 45        | cccagatcga    | tcccaccccc      | gtgatcgtca | cttccaacac | caacatgtgc | gccgtgattg | 240   |
|           | acgggaacag    | caccaccttc      | gagcaccagc | agccgttaca | agaccggatg | ttcaaatttg | 300   |
|           | aactcacccg    | ccgtctggag      | cacgactttg | gcaaggtgac | aaagcaggaa | gtcaaagagt | 360   |
| 50        | tetteegetg    | ggcgcaggat      | cacgtgaccg | aggtggcgca | tgagttctac | gtcagaaagg | 420   |
|           | gtggagccaa    | caagagaccc      | gcccccgatg | acgcggataa | aagcgagccc | aagcgggcct | 480   |
|           | gcccctcagt    | cgcggatcca      | tcgacgtcag | acgcggaagg | agctccggtg | gactttgccg | 540   |
|           |               |                 |            |            |            |            |       |
| 55        | acaggtacca    | aaacaaatgt      | tctcgtcacg | cgggcatgct | tcagatgctg | tttccctgca | 600   |

|           | gttcagaatg tttccccggc gtgtcagaat ctcaaccggt cgtcagaaag aggacgtatc    | 720  |
|-----------|----------------------------------------------------------------------|------|
| _         | ggaaactetg tgecatteat catetgetgg ggegggetee egagattget tgeteggeet    | 780  |
| 5         | gcgatctggt caacgtggac ctggatgact gtgtttctga gcaataaatg acttaaacca    | 840  |
|           | ggratggctg ccgatggtta tcttccagat tggctcgagg acaacctctc tgagggcatt    | 900  |
| 1         | cgcgagtggt gggacttgaa acctggagcc ccgaaaccca aagccaacca gcaaaagcag    | 960  |
| 10        | gacgacggcc ggggtctggt gcttcctggc tacaagtacc tcggaccctt caacggactc ]  | .020 |
|           | gacaagggag agccggtcaa cgcggcggac gcagcggccc tcgagcacga caaggcctac l  | .080 |
| 15        | gaccagcagc tcaaagcggg tgacaatccg tacctgcggt ataaccacgc cgacgccgag l  | .140 |
| 15        | tttcaggagc gtcttcaaga agatacgtct tttgggggca acctcgggcg agcagtcttc 1  | 200  |
|           | caggecaaga agegggttet egaacetete ggtetggttg aggaaggege taagaegget 1  | 260  |
| 20        | cctggaaaga agagacccat agaatccccc gactcctcca cgggcatcgg caagaaaggc 1  | 320  |
| 20        | cagcagcccg ctaaaaagaa gctcaacttt gggcagactg gcgactcaga gtcagtgccc 1  | 380  |
|           | gaccotcaac caatoggaga accoccogca ggoccototg gtotgggato tggtacaatg 1  | 440  |
| 25        | gctgcaggcg gtggcgctcc aatggcagac aataacgaag gcgccgacgg agtgggtaat 1  | 500  |
| 20        | gcctccggaa attggcattg cgattccaca tggctgggcg acagagtcat caccaccagc 1  | 560  |
|           | accegeacet gggccctgcc cacetacaac aaccacetet acaagcagat atcaagtcag 10 | 62 O |
| 30        | agoggggota ccaacgacaa ccacttotto ggotacagoa coccetgggg ctattttgac 16 | 580  |
| ••        | ttcaacagat tccactgcca cttctcacca cgtgactggc agcgactcat caacaacaac 17 | 740  |
|           | tggggattcc ggcccagaaa gctgcggttc aagttgttca acatccaggt caaggaggtc 18 | 300  |
| <i>35</i> | acgacgaacg acggcgttac gaccatcgct aataacctta ccagcacgat tcaggtcttc le | 360  |
|           | teggaetegg agtaceaact geogtacgte eteggetetg egeaceaggg etgeeteect le | 20   |
|           | cegtteeetg eggaegtgtt catgatteet cagtaeggat atetgaetet aaacaaegge 19 | 080  |
| 40        | agteagterg tgggaegtre etectretae tgeetggagt acttreetre teagatgerg 20 | 40   |
|           | agaacgggca ataactttga attcagctac acctttgagg aagtgccttt ccacagcage 21 | .00  |
|           | tatgegeaca gecagageet ggaceggetg atgaateece teategacea gtacetgtae 21 | 60   |
| 45        | tacctggccc ggacccagag cactacgggg tccacaaggg agctgcagtt ccatcaggct 22 | 20   |
|           | gggcccaaca ccatggccga gcaatcaaag aactggctgc ccggaccctg ttatcggcgg 22 | 80   |
|           | cagagactgt caaaagacat agacagcaac aacaacagta actttgcctg gaccggggcc 23 | 40   |
| 50        | actamatace atergaatgg tagamattem ttmmecamee egggegtage catggecace 24 | 00   |
|           | aacaaggacg acgaggacca gttctttccc atcaacggag tgctggtttt tggcaaaacg 24 | 60   |
|           | ggggctgcca acaagacaac gctggaaaac gtgctaatga ccagcgagga ggagatcaaa 25 | 20   |
| 55        | accaccaate cegtggetae agaagaatae ggtgtggtet ceagcaacet gcaategtet 25 | во   |
|           |                                                                      |      |

|    | #COOCCOOR       | CCCD 60C0CD       | #ACT##CDD  |            |            |            |      |
|----|-----------------|-------------------|------------|------------|------------|------------|------|
|    | 99009980        | cccayacaca        | gactyttaat | agccaggggg | crergeregg | catggtCtgg | 2640 |
|    | cagaaccggg      | acgtgtacct        | gcagggtccc | atctgggcca | aaattcctca | cacggacggc | 2700 |
| 5  | aactttcacc      | cgtctcccct        | gatgggcgga | tttggactca | aacacccgcc | tcctcaaatt | 2760 |
|    | ctcatcaaaa      | acaccccggt        | acctgctaat | cctccagagg | tgtttactcc | tgccaagttt | 2820 |
| 10 | gcctcattta      | tcacgcagta        | cagcaccggc | caggtcagcg | tggagatcga | gtgggaactg | 2880 |
| 10 | cagaaagaga      | acagcaaacg        | ctggaatcca | gagattcagt | acacctcaaa | ttatgccaag | 2940 |
|    | tctaataatg      | tggaatttgc        | tgtcaacaac | gaaggggttt | atactgagcc | tegecceatt | 3000 |
| 15 | ggcacccgtt      | acctcacccg        | taacctgtaa | ttacttgtta | atcaataaac | cggttgattc | 3060 |
| 75 | gtttcagttg      | aactttggtc        | tctgcgaagg | gcgaattc   |            |            | 3098 |
|    |                 |                   |            |            |            |            |      |
|    | <210> 38        |                   |            |            |            |            |      |
| 20 | <211> 3276      | • •               |            |            |            |            |      |
|    | <212> DNA       |                   |            |            |            |            |      |
|    | <213> new AAV s | serotype, cione 4 | 2.6a       |            |            |            |      |
|    | <400> 38        |                   |            |            |            |            |      |
| 25 |                 |                   |            |            |            |            |      |
|    |                 |                   | ,          |            | -          |            |      |
|    |                 |                   |            |            |            |            |      |
|    |                 |                   |            |            |            |            |      |

|    | gaattcgccc | ttcgcagaga | ccaaagttca | actgaaacga | attaaccggt | ttattgatta | 60   |
|----|------------|------------|------------|------------|------------|------------|------|
|    | acaggcaatt | acaggttacg | ggtgaggtaa | cgggtgccaa | tggggcgagg | ctcagtataa | 120  |
| 5  | accccttcgt | tgttgacage | aaattccaca | ttattagact | tggcataatt | tgaggtgtac | 180  |
|    | tgaatctctg | gattccagcg | tttgctgttt | tctttctgca | gttcccactc | gatctccacg | 240  |
|    | ctgacctggc | cggtgctgta | ctgcgtgata | aatgaggcaa | acttggcagg | agtaaacacc | 300  |
| 10 | tctggaggat | tagcaggtac | cggggtgttt | ttgatgagaa | tttgaggagg | cgggtgtttg | 360  |
|    | agtccaaatc | cgtccatcag | gggagacggg | tgaaagttgc | cgtccgtgtg | aggaattttg | 420  |
|    | gcccagatgg | gaccctgcag | gtacacgtcc | cggttctgcc | agaccatgcc | gggcagagcc | 48 Q |
| 15 | ccctggctgt | tgacagtctg | tgtctggggt | ccggccgtag | acgattgcag | gttgctggag | 540  |
|    | accacaccgt | attcttctgt | agccacggga | ttggtggttt | tgatctcctc | ctcgctggtc | 600  |
|    | attagcacgt | tttccagcgt | tgtcttgttg | gcagcccccg | ttttgccaaa | aaccagcact | 660  |
| 20 | ccgttgatgg | gaaagaactg | gtcctcgtcg | tccttgttgg | tggccatggc | tacgcccggg | 720  |
|    | ttggttaatg | aatttctacc | attcagatgg | tatttagtgg | ccccggtcca | ggcaaagtta | 780  |
|    | ctgttgttgt | tgctgtctat | gttttttgac | agtototgot | gccgataaca | gggtccgggc | 840  |
| 25 | agccagttct | ttgattgctc | ggccatggtg | ttgggcccag | cctgatggaa | ctgcagctcc | 900  |
|    | cttgtggacc | ccgtagtgct | ctgggtccgg | gccaggtagt | acaggtactg | gtcgatgagg | 960  |
|    | ggattcatca | gccggtccag | gctctggcta | tgcgcatagc | tgctgtggaa | aggcacttcc | 1020 |
| 30 | tcaaaggtgt | agctgaattc | aaagttattg | cccgttctca | gcatctgaga | aggaaagtac | 1080 |
|    | tccaggcagt | agaaggagga | acgteceaca | gactgactgc | cgttgtttag | agtcagatat | 1140 |
|    | ccgtactgag | gaatcatgaa | cacgtccgca | gggaacggag | ggaggcagcc | ctggtgcgca | 1200 |
| 35 |            |            |            |            |            |            |      |

|           | gagccgagg  | a cgtacggcag | ttggtactcc   | gagtccgage | agacctgaa  | t cgtgctggta | 1260 |
|-----------|------------|--------------|--------------|------------|------------|--------------|------|
|           | aggttattag | g cgatggtcgt | aacgccgtcg   | teegtegtge | cctccttga  | c ctggatgttg | 1320 |
| 5         | aacaacttg  | a accgcagett | tetgggeegg   | aatccccagt | tgttgttga  | gagtcgctgc   | 1380 |
|           | cagtcacgt  | g gtgagaagtg | gcagtggaat   | ctgttaaagt | caaaatacco | ccagggggtg   | 1440 |
| 40        | ctgtagccga | a agtaggtgtt | gtcgttggtg   | cttcctcccg | atgtcccgtt | ggagatttgc   | 1500 |
| 10        | ttgtagaggt | ggttgttgta   | ggtgggagg    | gcccaggttc | gggtgctggt | ggtgatgact   | 1560 |
| ·         | ctgtcgccca | gccatgtgga   | ategeaatge   | caatttcctg | aggaactaco | cactccgtcg   | 1620 |
| 45        | gcgccttcgt | tattgtctgc   | cattggagcg   | ccaccgcctg | cagccattgt | accagatece   | 1680 |
| 15        | agaccagagg | ggcctgcggg   | gggttctccg   | attggttgag | ggtcgggcac | : tgactctgag | 1740 |
|           | togcoagtot | gcccaaagtt   | gagtetettt   | ttcgcgggct | gctggcctgt | cttgccgatg   | 1800 |
|           | cccgtagagg | agtctggaga   | acgctggggt   | gatggctcta | ccggtctctt | ctttccagga   | 1860 |
| 20        | gccgtcttag | cgccttcctc   | aaccagaccg   | agaggttcga | gaacccgctt | cttggcctgg   | 1920 |
|           | aagactgctc | gcccgaggtt   | gcccccaaaa   | gacgtatctt | cttgaagacg | ctcctgaaac   | 1980 |
| 25        | teggegtegg | cgtggttgta   | cttgaggtac   | gggttgtccc | cctgctcgag | ctgcttgtcg   | 2040 |
| <i>25</i> | taggccttgt | cgtgctcgag   | ggccgcggcg   | tctgcctcgt | tgaccggctc | tcccttgtcg   | 2100 |
|           | agtccgttga | agggtccgag   | gtacttgtag   | ccaggaagca | ccagaccccg | gccgtcgtcc   | 2160 |
|           | tgcttttgct | ggttggcttt   | gggtttcggg   | gctccaggtt | tcaagtccca | ccactcgcga   | 2220 |
| 30        | atgccctcag | agaggttgtc   | ctcgagccaa   | tctggaagat | aaccatcggc | agccatacct   | 2280 |
|           | ggtttaagtc | atttattgct   | cagaaacaca   | gtcatccagg | tccacgttga | ccagatcgca   | 2340 |
|           | ggccgagcaa | gcaatctcgg   | gagcccgccc   | cagcagatga | tgaatggcac | agagtttccg   | 2400 |
| 35        | atacgtcctc | tttctgacga   | ccggttgaga'  | ttctgacacg | ccggggaaac | attctgaaca   | 2460 |
|           | gtetetggte | ccgtgcgtga   | agcaeatgtt   | gaaattctga | ttcattctct | cgcatgtctt   | 2520 |
|           | gcagggaaac | agcatctgaa   | gcatgcccgc   | gtgacgagaa | cacttgtttt | ggtacctgtc   | 2580 |
| 40        | ggcaaagtcc | accggagctc   | cttccgcgtc   | tgacgtcgat | ggatgcaaaa | tgtcgcaaaa   | 2640 |
|           | gcactcacgt | gacagctaat   | acaggaccac   | teccetatga | cgtgatttac | gtcagcgcta   | 2700 |
|           | tgcccgcgtg | acgagaacat   | ttgttttggt   | acctgtcggc | aaagtccacc | ggagctcctt   | 2760 |
| 45        | ccgcgtctga | cgtcgatgga   | tccgcgactg   | aggggcaggc | ccgcttgggc | togottttat   | 2820 |
|           | ccgcgtcatc | gggggcgggt   | ctcttgttgg   | ctccaccctt | tctgacgtag | aactcatgcg   | 2880 |
|           | ccacctcggt | cacgtgatcc   | tgcgcccagc   | ggaagaactc | tttgacttcc | tgctttgtca   | 2940 |
| 50        | ccttgccaaa | gtcatgctcc   | agacggcggg · | tgagttcasa | tttgaacatc | cggtcctgca   | 3000 |
|           | acggctgctg | gtgctcgaag   | gtggtgctgt   | tcccgtcaat | cacggcgcac | atgttggtgt   | 3060 |
|           | tggaagtgac | gatcacgggg   | gtgggatcga 1 | tctgggcgga | agacttgcac | ttttggtcca   | 3120 |
| <i>55</i> |            |              |              |            |            |              |      |

|      |                                                           |                   | _          |            |            |            |      |
|------|-----------------------------------------------------------|-------------------|------------|------------|------------|------------|------|
|      | cgcgcacctt                                                | gctgccgccg        | agaatggcct | tggcggactc | cacgaccttg | gccgtcatct | 3180 |
|      | tgccctcctc                                                | ccaccagatc        | accatcttgt | cgacgcaatc | gttgaaggga | aagttctcat | 3240 |
| 5    | tggtccagtt                                                | gacgcagccg        | tagaaagggc | gaattc     |            |            | 3276 |
| 10   | <210> 39<br><211> 3084<br><212> DNA<br><213> new AAV sero | otype, clone 43.1 | I          |            |            |            |      |
| 15 . | <400> 39                                                  |                   |            |            |            |            |      |
| 20   |                                                           | ,                 |            |            |            |            |      |
| 25   |                                                           |                   |            |            |            |            |      |

| gaattcgccc   | tttctacgg    | tgcatcaact | ggaccaatg    | a gaactttccc | ttcaacgatt | 60   |
|--------------|--------------|------------|--------------|--------------|------------|------|
| gcgtcgacaa   | gatggtgatc   | tggtgggag  | g agggcaagat | gacggccaaq   | gtcgtggagt | 120  |
| ccgccaaggc   | : cattctcggc | ggcagcaag  | tgcgcgtgg:   | ccaaaagtgo   | aagtcgtccg | 180  |
| cccagatcga   | cccacccc     | gtgatcgtca | cctccaacad   | : caacatġtgc | gccgtgattg | 240  |
| acgggaacag   | caccacctto   | gagcaccago | agccgttgce   | ggaccggatg   | ttcaagttcg | 300  |
| aactcacccg   | ccgtctggag   | cacgactttg | gcaaggtgac   | : caagcaggaa | gtcaaagagt | 360  |
| tcttccgctg   | ggcgcaggat   | cacgtgaccg | aggtggcgca   | tgagttctac   | gtcagaaagg | 420  |
| gcggagccag   | caaaagaccc   | gcccccgatg | acgcggatat   | aagcgagccc   | aagcgggcct | 480  |
| gecettagt    | cgcggatcca   | tcgacgtcag | acgcggaagg   | agctccggtg   | gactttgccg | 540  |
| acaggtacca   | aaacaaatgt   | tctcgtcacg | cgggcatgct   | tcagatgctg   | tttccctgca | 600  |
| aaacgtgcga   | gaaaatgaat   | cagaatttca | acatttgctt   | cacgcacggg   | gtcagagact | 660  |
| gctcagaatg   | tttccccggt   | gcatcagaat | ctcaaccggt   | cgtcagaaaa   | aaaacgtatc | 720  |
| agaaactgtg   | tgccattcat   | catctgctgg | ggcgggcacc   | cgagattgct   | tgctcggcct | 780  |
| gcgatctggt   | caacgtggac   | ctggacgact | gtgtttctga   | gcaataaatg   | acttaaacca | 840  |
| , ggtatggctg | ccgatggtta   | tcttccagat | tggcttgagg   | acaacctctc   | tgagggcatt | 900  |
| cgcgagtggt   | gggacctgaa   | acctggagcc | ccgaaaccca   | aagccaacca   | gcaaaagcag | 960  |
| gacgacggcc   | ggggtctggt   | gcttcctggc | tacaagtacc   | toggaccett   | caacggactc | 1020 |
| gacaaggggg   | agcccgtcaa   | cgcggcggac | gcagcggccc   | tcgagcacga   | caaggcctac | 1080 |
| gaccagcagc   | tcaaagcggg   | tgacaatccg | tacctgcggt   | ataaccacgc   | cgacgccgag | 1140 |
| tttcaggagc   | gtctgcaaga   | agatacgtst | tttgggggca   | acctcgggcg   | agcagtette | 1200 |
| caggccaaga   | agcgggttct   | cgaacctctc | ggtctggttg   | aggaaggcgc   | taagacggct | 1260 |
| cctggaaaga   | agagaccggt   | agagccatca | cctcagcgtt   | ccccgactc    | ctccacgggc | 1320 |
| atcggcaaga   | aaggccacca   | gcccgcgaga | aagagactga   | actttgggca   | gactggcgac | 1380 |
| toggagtcag   | teccegacec   | tcaaccaatc | ggagaaccac   | cagcaggccc   | ctctggtctg | 1440 |
| ggatctggta   | caatggctgc   | aggcggtggc | gctccaatgg   | cagacaataa   | cgaaggcgcc | 1500 |
| gacggagtgg   | gtagttcctc   | aggaaattgg | cattgcgatt   | ccacatggct   | gggcgacaga | 1560 |

5

|      | groatcacca | ccagcacccy | aacccgggcc | Cigeceacei | acaacaacca | tetetacaag | 1620   |
|------|------------|------------|------------|------------|------------|------------|--------|
|      | caaatctcca | acgggacatc | gggaggaagc | actaacgaca | acacctactt | tggctacagc | 1680   |
| 5    | accccctggg | ggtattttga | cttcaacaga | ttccactgcc | acttctcacc | acgtgactgg | 1740   |
|      | cagcgactca | tcaacaataa | ctggggattc | cggcccaaga | gactcaactt | caagctcttc | 1800   |
|      | aacatccagg | tcaaggaggt | cacgcagaat | gaaggcacca | agaccatcgc | caataacctt | , 1860 |
| 10   | accagcacga | ttcaggtgtt | tacggactcg | gaataccagc | tcccgtacgt | ccccggctct | 1920   |
|      | gcgcaccagg | gctgcctccc | tccgttcccg | gcggacgtct | tcatgattcc | tcagtacggg | 1980   |
|      | tatctgaccc | taaacaatgg | cagtcaggct | gtgggccgtt | cctccttcta | ctgcctggaa | 2040   |
| 15   | tacttccctt | ctcaaatgct | gaggacgggc | aacaactttg | aattcagcta | caccttcgag | 2100   |
|      | gacgtgcctt | tccacagcag | ctacgcgcac | agccagagcc | tggaccggct | gatgaaccct | 2160   |
|      | ctcatcgacc | agtacctgta | ttacttatcc | agaactcagt | ccacaggagg | aactcaaggt | 2220   |
| 20   | actcagcaat | tgttattttc | tcaagccggg | cccgcaaaca | tgtcggctca | ggccaagaac | 2280   |
| ,    | tggctacctg | gaccgtgtta | ccgtcagcaa | cgagtttcca | cgacactgtc | gcaaaacaac | 2340   |
| ac.  | aacagcaatt | ttgcttggac | cggtgccacc | aagtatcacc | tgaatggcag | agactccctg | 2400   |
| 25   | gttaatcccg | gcgttgccat | ggctacccac | aaggacgacg | aggagcgctt | cttcccgtca | 2460   |
|      | agcggagttc | taatgtttgg | caagcagggg | gctggaaaag | acaatgtgga | ctacagcagc | 2520   |
| 30   | gtgatgctca | ccagcgaaga | agaaattaaa | actactaacc | cagtggctac | agagcagtat | 2580   |
| JU   | ggtgtggtgg | cagacaacct | gcagcagacc | aacggagctc | ccattgtggg | aactgtcaac | 2640   |
|      | agccaggggg | ccttacctgg | tatggtctgg | caaaaccggg | acgtgtacct | gcagggcccc | 2700   |
| 35 • | atctgggcca | aaattcctca | cacggacggc | aactttcatc | cttcgccgct | gatgggaggc | 2760   |
|      | tttggactga | aacacccgcc | tcctcagatc | ctggtgaaaa | acactcctgt | tcctgcggat | 2820   |
|      | cctccgacca | ccttcagcca | ggccaagctg | gcttctttta | tcacgcagta | cagcaccgga | 2880   |
| 10   | caggtcagcg | tggaaatcga | atgggagctg | cagaaagaaa | acagcaagcg | ctggaaccca | 2940   |
| ·    | gagattcagt | atacttccaa | ctactacaaa | tctacaaatg | tggactttgc | tgtcaatact | 3000   |
|      | gagggtactt | attcagagcc | tcgccccatt | ggcactcgtt | atctcacccg | taatctgtaa | 3060   |
| 15   | ttgcttgtta | atcaatasac | cggt       |            |            |            | 3084   |
| -    |            |            |            |            |            |            |        |

<210> 40

<211> 2370

<212> DNA

<213> new AAV serotype, clone 43.5

<400> 40

55

|    |   | EP 1 310 571 B1 |            |            |            |            |            |      |  |  |
|----|---|-----------------|------------|------------|------------|------------|------------|------|--|--|
|    |   | gaattcgccc      | tttctacggc | tgcgtcaact | ggaccaatga | gaactttccc | ttcaacgatt | . 60 |  |  |
|    |   | gcgtcgacaa      | gatggtgatc | tggtgggagg | agggcaagat | gacggccaag | gtcgtggagt | 120  |  |  |
| 5  |   | ccgccaaggc      | cattctcggc | ggcagcaagg | tgcgcgtgga | ccaaaagtgc | aagtcgtccg | 180  |  |  |
|    |   |                 |            |            |            |            | - •-       |      |  |  |
| ,  | , |                 |            |            |            |            |            |      |  |  |
| 10 |   |                 |            |            |            |            |            |      |  |  |
|    |   |                 |            |            | •          |            |            |      |  |  |
| 15 |   |                 |            |            |            |            |            |      |  |  |
|    |   |                 |            |            |            |            |            |      |  |  |
|    |   |                 |            |            |            | •          |            |      |  |  |
| 20 |   |                 |            |            |            |            |            |      |  |  |
|    |   |                 |            |            |            |            |            |      |  |  |
|    |   |                 |            |            |            |            |            |      |  |  |
|    |   |                 |            |            |            |            |            |      |  |  |

|    | • | • |  |   |  |
|----|---|---|--|---|--|
|    |   |   |  |   |  |
| 35 |   |   |  |   |  |
|    |   |   |  | • |  |

| 40 |   |  |
|----|---|--|
|    | • |  |

|   |  | • |
|---|--|---|
|   |  |   |
| • |  |   |
|   |  |   |

|   |    | • |  |
|---|----|---|--|
| 0 | •• |   |  |
|   |    |   |  |
|   |    |   |  |

|    |   | • |  |
|----|---|---|--|
| 55 | • |   |  |
|    |   |   |  |
|    |   |   |  |

5

·

|   | cccagatcg  | a ccccacccc  | c gtgatcgtca | cctccaacac   | caacatgtgc   | gccgtgattg | 240  |
|---|------------|--------------|--------------|--------------|--------------|------------|------|
|   | acgggaaca  | g caccacett  | c gagcaccago | agccgttgca   | ggaccggatg   | ttcaagttcg | 300  |
|   | aactcaccc  | g ccgtctgga  | g cacgacttt  | g gcaaggtgac | : caagcaggaa | gtcaaagagt | 3 60 |
|   | tetteeget  | ggcgcagga    | t cacgtgaccg | aggtggcgca   | tgagttctac   | gtcagaaagg | 420  |
|   | gcggagccac | r caaaagacco | c'gcccccgatg | acgcggatat   | aagcgagccs   | aagcgggcct | 480  |
|   | gcccctcagt | cgcggatcca   | a togacgtcag | acgcggaagg   | agctccggtg   | gactttgccg | 540  |
|   | acaggtacca | aaacaaatgt   | tetegteacg   | cgggcatgct   | tcagacgctg   | tttccctgca | 600  |
|   | aaacgtgcga | gagaatgaat   | cagaatttca   | acatttgctt   | cacgcacggg   | gtcagagact | 660  |
|   | gctcagaatg | tttccccggt   | gcatcagaat   | ctcaaccggt   | cgtcagaaaa   | aaaacgtatc | 720  |
|   | agaaactgtg | tgccattcat   | : catctgctgg | ggcgggcacc   | cgagattgct   | tgctcggcct | 780  |
|   | gcgatctggt | caacgtggac   | : ctggacgact | gtgtttctga   | gcaataaatg   | acttaaacca | 840  |
|   | ggtatggctg | ccgatggtta   | tcttccagat   | tggcttgagg   | acaacctctc   | tgagggcatt | 900  |
|   | cgcgagtggt | gggacctgaa   | acctggagcc   | ccgaaaccca   | aagccaacca   | gcaaaagcag | 960  |
|   | gacgacggcc | ggggtctggt   | getteetgge   | tacaagtacc   | tcggaccctt   | caacggactc | 1020 |
|   | gacaaggggg | agcccgtcaa   | cgcggcggac   | gcagcggccc   | tcgagcacga   | caaggcctac | 1080 |
|   | gaccagcagc | tcaaagcggg   | tgacaatccg   | tacctgcggt   | ataaccacgc   | cgacgccgag | 1140 |
|   | tttcaggagc | gtctgcaaga   | agatacgtct   | tttgggggca   | acctcgggcg   | agcagtcttc | 1200 |
|   | caggccaaga | agcgggttct   | cgaacctctc   | ggtctggttg   | aggaaggcgc   | taagacggct | 1260 |
|   | cctggaaaga | agagaccggt   | agagccatca   | cctcagcgtt   | cccccgactc   | ctccacgggc | 1320 |
|   | atcggcaaga | aaggccacca   | gcccgcgaga   | aagagactga   | actttgggca   | gactggcgac | 1380 |
|   | tcggagtcag | tccccgaccc   | tcaaccaatc   | ggagaaccac   | cagcaggccc   | ctctggtctg | 1440 |
|   | ggatctggta | caatggctgc   | aggcggtggc   | gctccaatgg   | cagacaataa   | cgaaggcgcc | 1500 |
|   | gacggagtgg | gtagttcctc   | aggaaattgg   | cattgcgatt   | ccacatggct   | gggcgacaga | 1560 |
|   | gtcatcacca | ccagcacccg   | aacctgggcc   | ctgcccacct   | acaacaacca   | tctctacaag | 1620 |
|   | caaatctcca | acgggacatc   | gggaggaagc   | actaecgaca   | acacctactt   | tggctacagc | 1680 |
|   | accccctggg | ggtattttga   | cttcaacaga   | ttccactgcc   | acttctcacc   | acgtgactgg | 1740 |
|   | cagcgactca | tcaacaataa   | ctggggattc   | cggcccaaga   | gactcaactt   | caagctcttc | 1800 |
| • | aacatccagg | tcaaggaggt   | cacgcagaat   | gaaggcacca   | agaccatcgc   | caataacctt | 1860 |
|   | accagcacga | ttcaggtgtt   | tacggactcg   | gaataccagc   | tcccgtacgt   | cctcggctct | 1920 |
|   | gcgcaccagg | gctgcctccc   | tccgttcccg   | gcggacgtct   | tcatgattcc   | tcagtacggg | 1980 |
|   | tatctgaccc | taaacaatgg   | cagtcaggct   | gtgggccgtt   | cctccttcta   | ctgcctggaa | 2040 |
|   | tacttccctt | ctcaaatgct   | gaggacgggc   | aacaactttg   | aattcagcta   | caccttcgag | 2100 |

|    |                    | •                 |            |            |            |            |      |
|----|--------------------|-------------------|------------|------------|------------|------------|------|
|    |                    |                   |            |            |            |            |      |
|    | gacgtgcctt         | tccacagcag        | ctacgcgcac | agccagagcc | tggaccggct | gatgaaccct | 2160 |
| 5  | ctcatcgacc         | agtacctgta        | ttacttatcc | agaactcagt | ccacaggagg | aactcaaggt | 2220 |
|    | actcagcaat         | tgttattttc        | tcaagccggg | cccgcaaaca | tgtyggctca | ggccaagaac | 2280 |
|    | tągctacctg         | gaccgtgtta        | ccgtcagcaa | cgagtttcca | cgacactgtc | gcasaacaac | 2340 |
| 10 | aacagcaatt         | ttgctggacc        | ggtgccacca |            |            |            | 2370 |
|    |                    |                   |            |            |            |            |      |
|    | <210> 41           |                   |            |            |            |            |      |
|    | <211> 3123         |                   |            |            |            |            |      |
| 15 | <212> DNA          | •                 |            |            |            |            |      |
|    | <213> new AAV sero | otype, clone 43.1 | 12         |            |            |            |      |
|    | <400> 41           |                   |            |            |            |            |      |
| 20 |                    |                   |            |            |            |            |      |
|    |                    |                   |            |            |            |            |      |
|    |                    |                   |            |            |            |            |      |
|    |                    |                   |            |            |            |            |      |
| 25 |                    |                   |            |            |            |            |      |
|    |                    |                   |            |            |            |            |      |
|    |                    |                   |            |            |            |            | -    |
|    |                    |                   |            |            |            |            |      |
| 20 |                    |                   |            | •          |            |            |      |

|    | gaattcgccc | ttggctgcgt | caactggaco | astgagaact | : ttecettea | a cgattgcgtc | 6    |
|----|------------|------------|------------|------------|-------------|--------------|------|
|    | gacaagatgg | tgatctggtg | ggaggaggg  | aagatgacgg | ccaaggtcg   | t ggagtccgcc | 12   |
|    | aaggccattc | teggeggeag | caaggtgcgc | gtggaccaaa | agtgcaagt   | gtccgcccag   | 18   |
|    | atcgacccca | cccccgtgat | cgtcacctcc | aacaccaaca | tgtgcgccgt  | gattgacggg   | 240  |
|    | aacagcacca | ccttcgagca | ccagcagccg | ttgcaggacc | ggatgttcas  | gttcgaactc   | 300  |
|    | accegeegte | tggagcacga | ctttggcaag | gtgaccaagc | aggaagtcaa  | agagttcttc   | 360  |
|    | cgctgggcgc | aggatcacgt | gaccgaggtg | gcgcatgagt | tctacgtcag  | aaagggcgga   | 420  |
|    | gccagcaaaa | gacccgcccc | cgatgacgcg | gatataagcg | agcccaagcg  | ggcctgcccc   | 480  |
|    | tcagtcgcgg | atccatcgac | gtcagacgcg | gaaggagctc | cggtggactt  | tgccgacagg   | 540  |
|    | taccaaaaca | aatgttctcg | tcacgcgggc | atgctccaga | tgctgtttcc  | ctgcaaaacg   | 600  |
|    | tgcgagagaa | tgaatcagaa | tttcaacatt | tgcttcacgc | acggggtcag  | agactgctca   | 660  |
|    | gaatgtttcc | ccggtgcatc | agaatctcaa | ccggtcgtca | gaaaaaaac   | gtatcagaaa   | 720  |
|    | ctgtgtgcca | ttcatcatct | gctggggcgg | gcacccgaga | ttgcttgctc  | ggcctgcgat   | 780  |
|    | ctggtcaacg | tggacctgga | cgactgtgtt | tctgagcaat | aaatgactta  | aaccaggtat   | 840  |
|    | ggctgccgat | ggttatcttc | cagattggct | tgaggacaac | ctctctgagg  | gcattcgcga   | 900  |
|    | gtggtgggac | ctgaaacctg | gagccccgaa | acccasagcc | aaccagcaaa  | agcaggacga   | 960  |
|    | cggccggggt | ctggtgcttc | ctggctacaa | gtacctcgga | cccttcaacg  | gactcgacaa   | 1020 |
|    | gggggagccc | gtcaacgcgg | cggacgcagc | ggccctcgag | cacgacaagg  | cctacgacca   | 1080 |
|    | gcagctcaaa | gcgggtgaca | atccgtacct | gcggtataac | cacgccgacg  | ccgagtttca   | 1140 |
|    | ggagcgtctg | caagaagata | cgtcttttgg | gggcaacctc | gggcgagcag  | tcttccaggc   | 1200 |
| ٠. | caagaagcgg | gttctcgaac | ctctcggtct | ggttgaggaa | ggcgctaaga  | cggctcctgg   | 1260 |
|    | aaagaagaga | ccggtagagc | catcacctca | gcgttccccc | gactcctcca  | cgggcatcgg   | 1320 |
|    | caagaaaggc | caccagcccg | cgagaaagag | actgaacttt | gggcagactg  | gcgactcgga   | 1380 |
|    | gtcagtcccc | gaccctcaac | caatcggaga | accaccagca | aacccctcta  | atctaggatc   | 1440 |

· 30

|    | - 5,       | , 900,009,00 | g gragegee.  | e aatggeaga  | dacuacyda   | a acaccagecad | 1200  |
|----|------------|--------------|--------------|--------------|-------------|---------------|-------|
| _  | agtgggtag  | t tootcagga  | a attggcatt  | g cgattccac  | tggctgggc   | g acagagtcat  | 1560  |
| 5  | caccaccago | acccgaacc    | t gggccctgc  | c cacctacaac | aaccatctc   | t acaagcaaat  | 1620  |
|    | ctccaacgg  | acatcggga    | g gaagcactaa | a cgacaacac  | tactttggc   | acagcacccc    | 1680  |
|    | ctgggggtat | tttgacttca   | a acagattcca | a ctgccactto | : tcaccacgt | g actggcagcg  | 1740  |
| 10 | actcatcaac | aataactgg    | gattccggcc   | caegagacto   | : aacttcaag | tottcaacat    | 1800  |
|    | ccaggtcaag | gaggtcacgo   | agaatgaagg   | , caccaagacc | atcgccaata  | accttaccag    | 1860  |
| 15 | cacgattcag | gtgtttacgg   | actcggaata   | ccagctcccg   | tacgtcctcg  | gctctgcgca    | 1920  |
| 15 | ccagggctgc | ctccctccgt   | tcccggcgga   | cgtcttcatg   | attcctcagt  | acgggtatet    | 1980  |
|    | gaccctaaac | aatggcagto   | aggetgtggg   | cegttectec   | ttctactgcc  | tggaatactt    | 2040  |
| 20 | cccttctcaa | atgctgagga   | cgggcaacaa   | ctttgaattc   | agctacacct  | tcgaggacgt    | 2100  |
|    | gcctttccac | agcagctacg   | cgcacagcca   | gagectggae   | cggctgatga  | acceteteat    | 2160  |
|    | cgaccagtac | ctgtattact   | tatccagaac   | tcagtccaca   | ggaggaactc  | aaggtactca    | 2220  |
| 25 | gcaattgtta | ttttctcaag   | ccgggcccgc   | aaacatgtcg   | gctcaggcca  | agaactggct    | 2280  |
|    | acctggaccg | tgttaccgtc   | agcaacgagt   | ttccacgaca   | ctgtcgcaaa  | acaacaacag    | 2340  |
|    | caattttgct | tggaccggtg   | ccaccaagta   | tcacctgaat   | ggcagagact  | ccctggttaa    | 2400  |
| 30 | tcccggcgtt | gccatggcta   | cccacaagga   | cgacgaggag   | cgcttcttcc  | cgtcaagcgg    | 24 60 |
|    | agttctaatg | tttggcaagc   | agggggctgg   | aaaagacaat   | gtggactaca  | gcagcgtgat    | 2520  |
|    |            |              | ttaaaactac   |              |             |               | 2580  |
| 35 |            |              | agaccaacgg   |              | •           |               | 2640  |
|    | gggggcctta | cctggtatgg   | tctggcaaaa   | ccgggacgtg   | tacctgcagg  | gccccatctg    | 2700  |
|    |            |              | acggcaactt   |              |             |               | 2760  |
| 40 |            |              | agatcctggt   |              |             |               | 2820  |
|    |            |              | agctggcttc   |              |             | _             | 2880  |
|    |            |              | agctgcagaa   |              |             |               | 2940  |
| 45 |            |              | acaaatctac   |              |             |               | 3000  |
|    |            |              | ccattggcac   |              |             |               | 3060  |
|    | tgttaatcaa | taaaccggtt   | aattogttto   | agttgaactt   | tggtctctgc  | gaagggcgaa    | 3120  |
| 50 | ttc        |              |              |              |             |               | 3123  |
|    |            |              |              |              |             |               |       |

<210> 42

<211> 3122

<212> DNA

55

<213> new AAV serotype, cione 43.20

<400> 42

|    | gaattcgccc | tttctacggc   | tgcgtcaact | ggaccaatga | gaactttccc | ttcaacgatt  | 60   |
|----|------------|--------------|------------|------------|------------|-------------|------|
|    | gcgtcgacaa | gatggtgatc   | tggtgggagg | agggcaagat | gacggccaag | gtcgtggagt  | 120  |
| 5  | ccgccaaggc | cattetegge   | ggcagcaagg | tgcgtgtgga | ccaaaagtgo | aagtottoog. | 180  |
|    | cccagatcga | tcccaccccc   | gtgatcgtca | cctccaacac | caacatgtgc | gccgtgattg  | 240  |
|    | acgggaacag | cgccaccttc   | gagcaccagc | agccgttgca | ggaccggatg | ttcaaatttg  | 300  |
| 10 | aactcacccg | ccgtctggag   | catgactttg | gcaaggtgac | gaagcaggaa | gtcaaagagt  | 360  |
|    | tcttccgctg | ggcgcaggat   | cacgtgaccg | aggtggcgca | tgagttccac | gtcagaaagg  | 420  |
|    | gtggagccaa | caagagaccc   | gcccccgatg | acgcggatat | aagcgagccc | aagcgggcct  | 480  |
| 15 | gcccctcagt | cgcggatcca   | tcgacgtcag | acgcggaagg | agctccggtg | gactttgccg  | 540  |
|    | acaggtacca | aaacaaatgt   | tctcgtcacg | cgggcatgct | tcagatgctg | tttccctgca  | 600  |
|    | agacatgcga | gagaatgaat   | cagaatttca | acatttgctt | cacgcacggg | accagagact  | 660  |
| 20 | gttcagaatg | tttccccggc   | gtgtcagaat | ctcaaccggt | cgtcagaaag | aggacgtatc  | 720  |
|    | ggaaactctg | tgcgattcat   | catctgctgg | ggcgggctcc | cgagattgct | tgctcggcct  | 780  |
|    | gcgatctggt | caacgtggac   | ctggatgact | gtgtttctga | gcaataaatg | acttaaacca  | 840  |
| 25 | ggtatggctg | ccgatggtta   | tcttccagat | tggctcgagg | acaacctctc | tgagggcatt  | 900  |
|    | cgcgagtggt | gggacttgaa   | acctggagcc | ccgaaaccca | aagccaacca | gcaaaagcag  | 960  |
|    | gacgacggcc | ggggtctggt   | gcttcctggc | tacaagtacc | tcggaccctt | caacggactc  | 1020 |
| 30 | gacaaggggg | agcccgtcaa   | cgcggcggac | gcagcggccc | tcgagcacga | caaagcctac  | 1080 |
|    | gaccagcagc | tcaaagcggg   | tgacaatccg | tacctgcggt | ataatcacgc | cdecdccded  | 1140 |
|    | tttcaggagc | gtctgcaaga   | agatacgtct | tttgggggca | acctcgggcg | agcagtcttc  | 1200 |
| 35 | caggccaaga | agcgggttct   | cgaacctctc | ggtctggttg | aggaaggcgc | taagacggct  | 1260 |
|    | cctggaaaga | agagactggt   | agagcagtcg | ccacaagagc | cagactcctc | ctcgggcatc  | 1320 |
|    | ggcaagacag | gccagcagcc   | cgctaaaaag | agactcaatt | ttggtcagac | tggcgactca  | 1380 |
| 40 | gagtcagtcc | ccgacccaca   | acctctcgga | gaacctccag | cagccccctc | aggtctggga  | 1440 |
|    | cctaatacaa | tggcttcagg   | eggtggeget | ccaatggcag | acastascga | aggcgccgac  | 1500 |
|    | ggagtgggta | attcctcggg   | aaattggcat | tgcgattcca | catggctggg | ggacagagtc  | 1560 |
| 45 | atcaccacca | gcacccgaac   | ctgggccctg | cccacctaca | acaaccacct | ctacaagcaa  | 1620 |
|    | atctccaacg | gcacctcggg   | aggaagcacc | aacgacaaca | cctattttgg | ctacagcacc  | 1680 |
|    | ccctgggggt | attttgactt   | caacagattc | cactgtcact | tttcaccacg | tgactggcaa  | 1740 |
| 50 | cgactcatca | acaacaattg   | gggattccgg | cccaaaagac | tcaacttcaa | gctgttcaac  | 1800 |
|    | atccaggtca | aggaagtcac   | gacgaacgaa | ggcaccaaga | ccatcgccaa | taatctcacc  | 1860 |
|    | agcaccgtgc | aggtctttac ( | ggactcggag | taccagttac | cgtacgtgct | aggatecget  | 1920 |

1980

caccagggat gtctgcctcc gttcccggcg gacgtcttca cggttcctca gtacggctat

| _          | ttaactttaa acaatggaag cc                                                   | aagccctg ggacgttcct | ccttctactg tctggagtat | 2040         |
|------------|----------------------------------------------------------------------------|---------------------|-----------------------|--------------|
| 5          | ttcccatcgc agatgctgag aa                                                   | ccggcaac aactttcagt | tcagctacac cttcgaggac | 2100         |
|            | gtgcctttcc acagcagcta cg                                                   | cgcacage cagageetgg | acaggotgat gaatocooto | 2160         |
|            | ategaceagt acetgtacta co                                                   | tggtcaga acgcaaacga | ctggaactgg agggacgcag | 2220         |
| 10         | actotggcat tcagccaagc gg                                                   | gtcctagc tcaatggcca | accaggctag aaattgggtg | 2280         |
|            | cccggacctt gctaccggca gca                                                  | agegegte tecaegacaa | ccaaccagaa caacaacagc | 2340         |
| 45         | aactttgcct ggacgggagc tgo                                                  | caagttt aagctgaacg  | gccgagactc tctaatgaat | 2400         |
| 15         | ccgggcgtgg caatggcttc cca                                                  | acaaggat gacgacgacc | gcttcttccc ttcgagcggg | 2460         |
|            | gtcctgattt ttggcaagca agg                                                  | agccggg aacgatggag  | tggattacag ccaagtgctg | 2520         |
| 20         | attacagatg aggaagaaat caa                                                  | ggctacc aaccccgtgg  | ccacagaaga atatggagca | 2580         |
| 20         | gtggccatca acaaccaggc cgc                                                  | caatacg caggcgcaga  | ccggactcgt gcacaaccag | 2640         |
|            | ggggtgattc ccggcatggt gtg                                                  | gcagaet agagacgtgt  | acctgcaggg tcccatctgg | 2700         |
| <b>2</b> 5 | gccaaaattc ctcacacgga cgg                                                  | caacttt cacccgtctc  | ccctgatggg cggctttgga | 27 <b>60</b> |
| 25         | ctgaagcacc cgcctcctca aat                                                  | tctcatc aagaacacac  | cggttccagc ggacccgccg | 2820         |
|            | cttaccttca accaggccaa gct                                                  | gaactet tteateaege  | agtacagcac cggacaggtc | 2880         |
| 30         | agcgtggaaa tcgagtggga gct                                                  | gcagaaa gaaaacagca  | aacgctggaa tccagagatt | 2940         |
| 30         | caatacactt ccaactacta caa                                                  | atctaca aatgtggact  | ttgctgtcaa cacggaagga | 3000         |
|            | gtttatagcg agcctcgccc cat                                                  | tggcacc cgttacctca  | cccgcaacct gtaattacat | 3060         |
| 35         | gttaatcaat aaaccggtta att                                                  | cgtttca gttgaacttt  | ggtctctgcg aagggcgaat | 3120         |
|            | tc                                                                         |                     |                       | 3122         |
| 40         | <210> 43<br><211> 3117<br><212> DNA<br><213> new AAV serotype, clone 43.21 |                     |                       |              |
| 45         | <400> 43                                                                   |                     |                       |              |
|            | gaattcgccc ttggctgcgt caa                                                  | ctggacc aatgagaact  | ttcccttcaa cgattgcgtc | 60           |
|            | gacaagatgg tgatctggtg gga                                                  | ggagggc aagatgacgg  | ccaaggtcgt ggagtccgcc | 120          |
| 50         | aaggecatte teggeggeag caa                                                  | ggtgcgt gtggaccaaa  | agtgcaagtc ttccgcccag | 180          |
|            | atogatocca coccegtgat ogto                                                 | cacctcc aacaccaaca  | tgtgcgccgt gattgacggg | 240          |
|            | aacagcacca ccttcgagca cca                                                  | gcagccg ttgcaggacc  | ggatgttcaa atttgaactc | 30 <b>0</b>  |
| 55         | accogcogto tggagcatga ctt:                                                 | ggcaag gtgacgaagc   | aggaagtcaa agagttcttc | 36 <b>0</b>  |
|            | cgctgggcgc aggatcacgt gac                                                  | gaggtg gcgcatgagt   | tccacgtcag aaagggtgga | 420          |

|    | gccaacaag    | a gacccgccc  | cgatgacgcg   | g gatataagco | agcccaagcg | ggcctgcccc | 480  |
|----|--------------|--------------|--------------|--------------|------------|------------|------|
|    | tcagtcgcg    | g atccatcgad | gtcagacgcg   | gaaggagcio   | cggtggactt | tgccgacagg | 540  |
| 5  | taccaaaac    | a aatgttctco | tcacgcgggc   | : atgcttcaga | tgctgtttcc | ctgcaagaca | 600  |
|    | tgcgagaga    | a tgaatcagaa | tttcaacatt   | : tgcttcacgc | acgggaccag | agactgttca | 660  |
| 40 | gaatgtttc    | c ccggcgtgtc | : agaatctcaa | ccggtcgtca   | gaaagaggac | gtatcggaaa | 720  |
| 10 | ctctgtgcg    | a ttcatcatct | gctggggegg   | gctcccgaga   | ttgcttgctc | ggcctgcgat | 780  |
|    | ctggtcaac    | g tggacctgga | tgactgtgtt   | totgagosat   | aaatgactta | aaccaggtat | 840  |
| 15 | ggctgccga    | t ggttatcttc | cagattggct   | cgaggacaac   | ctctctgagg | gcattcgcga | 900  |
| 15 | gtggtggga    | c ttgaaacctg | gagccccgaa   | acccaaagcc   | aaccagcaaa | agcaggacga | 960  |
|    | caaccaaaa    | t ctggtgcttc | ctggctacaa   | gtacctcgga   | cccttcaacg | gactcgacaa | 1020 |
| 20 | gggggagcc    | gtcaacgcgg   | cggacgcagc   | ggccctcgag   | cacgacaaag | cctacgacca | 1080 |
|    | gcagctcaa    | a gcgggtgaca | atccgtacct   | gcggtataat   | cacgccgacg | ccgagtttca | 1140 |
| •  | ggagcgtct    | J caagaagata | cgtcttttgg   | gggcaacctc   | gggcgagcag | tcttccaggc | 1200 |
| 25 | caagaagcgg   | g gttctcgaac | ctctcggtct   | ggttgaggaa   | ggcgctaaga | cggctcctgg | 1260 |
|    | aaagaagaga   | a coggtagago | agtogocaca   | agagccagac   | tectectegg | gcatcggcaa | 1320 |
|    | gacaggccag   | g cagcccgcta | aaaagagact   | caattttggt   | cagactggcg | actcagagtc | 1380 |
| 30 | agtccccgac   | ccacaacctc   | tcggagaacc   | tecageagee   | ccctcaggtc | tgggacctaa | 1440 |
|    | tacaatggct   | tcaggcggtg   | gcgctccaat   | ggcagacaat   | aacgaaggcg | ccgacggagt | 1500 |
|    | gggtaattco   | tcgggaaatt   | ggcattgcga   | ttccacatgg   | ctgggggaca | gagtcatcac | 1560 |
| 35 | . caccagcacc | cgaacctggg   | ccctgcccac   | ctacaacaac   | cacctctaca | agcaaatctc | 1620 |
|    | caacggcacc   | tcgggaggaa   | gcaccaacga   | caacacctat   | tttggctaca | gcaccccctg | 1680 |
| •  | ggggtatttt   | gacttcaaca   | gattccactg   | tcacttttca   | ccacgtgact | ggcaacgact | 1740 |
| 40 | catcaacaac   | aattggggat   | tccggcccaa   | aagactcaac   | ttcaagctgt | tcaacatcca | 1800 |
|    | ggtcaaggaa   | gtcacgacga   | acgaaggcac   | caagaccatc   | gccaataatc | tcaccagcac | 1860 |
|    | cgtgcgggtc   | tttacggact   | cggagtacca   | gttaccgtac   | gtgctaggat | ccgctcacca | 1920 |
| 45 | gggatgtctg   | cctccgttcc   | cggcggacgt   | cttcatggtt   | cctcagtacg | gctatttaac | 1980 |
| -  | tttaaacaat   | ggaagccaag   | ccctgggacg   | ttectectte   | tactgtctgg | agtatttccc | 2040 |
|    | atcgcagatg   | ctgagaaccg   | gcaacaactt   | tcagttcagc   | tacaccttcg | aggacgtgcc | 2100 |
| 50 | tttccacagc   | agctacgcgc   | acagccagag   | cctggacagg   | ctgatgaatc | ccctcatcga | 2160 |
| •  | ccagtacctg   | tactacctgg   | tcagaacgca   | aacgactgga   | actggaggga | cgcagactct | 2220 |
|    | ggcattcagc   | caagcgggtc   | ctagctcaat   | ggccaaccag   | gctagaaatt | gggtgcccgg | 2280 |
| 55 | accttgctac   | cggcagcagc   | gcgtctccac   | gacaaccaac   | cagagcaaca | acagcaactt | 2340 |
|    |              |              |              |              |            |            |      |

| tgcctggacg     | ggagctgcca | agtttaagct | gaacggccga | gactctctaa | tgaatccggg      | 2400 |
|----------------|------------|------------|------------|------------|-----------------|------|
| cgtggcaatg     | gcttcccaca | aggatgacga | cgaccgcttc | ttcccttcga | gcggggtcct      | 2460 |
| gatttttggc     | aagcaaggag | ccgggaacga | tggagtggat | tacagccaag | tgctgattac      | 2520 |
| agatgaggaa     | gaaatcaagg | ctaccaaccc | cgtggccaca | gaagaatatg | gagcagtggc      | 2580 |
| catcaacaac     | caggccgcca | atacgcaggc | gcagaccgga | ctcgtgcaca | accagggggt      | 2640 |
| gattcccggc     | atggtgtggc | agaatagaga | cgtgtacctg | cagggtccca | tctgggccaa      | 2700 |
| aattcctcac     | acggacggca | actttcaccc | gtctcccctg | atgggcggct | ttggactgaa      | 2760 |
| gcacccgcct     | cctcaaattc | tcatcaagaa | cacaccggtt | ccagcggacc | cgccgcttac      | 2820 |
| cttcaaccag     | gccaagctga | actctttcat | cacgcagtac | agcaccggac | aggtcagcgt      | 2880 |
| ggaaatcgag     | tgggagctgc | agaaagaaaa | cagcaaacgc | tggaatccag | agattcaata      | 2940 |
| cacttccaac     | tactacaaat | ctacaaatgt | ggactttgct | gtcaacacgg | aaggagttta      | 3000 |
| <br>tagcgagcct | cgccccattg | gcacccgtta | cctcacccgc | aacctgtaat | tacatgttaa      | 3060 |
| tcaataaacc     | ggttaattcg | tttcagttga | actttggtct | ctgcgaaggg | cgaatt <i>c</i> | 3117 |
|                |            |            |            |            |                 |      |

<210> 44 <211> 3121

<212> DNA

<213> new AAV serotype, clone 43.23

<400> 44

| g  | aattcgccc | ttctacggct | gcgtcaactg  | gaccaatgag | aactttccct   | tcaacgattg | 6   |
|----|-----------|------------|-------------|------------|--------------|------------|-----|
| C  | gtcgacaag | atggtgatct | ggtgggagga  | gggcaagatg | acggccaagg   | tcgtggagtc | 120 |
| C  | gccaaggcc | attctcggcg | gcagcaaggt  | gcgtgtggac | caaaagtgca   | agtottccgc | 180 |
| c  | cagatogat | cccacccccg | tgatcgtcac  | ctccaacacc | aacatgtgcg   | ccgtgattga | 240 |
| Ç  | ggaacagc  | accaccttcg | agcaccagca  | gccgttgcag | , gaccggatgt | tcasatttga | 300 |
| a  | tcacccgc  | cgtctggagc | atgactttgg. | caaggtgacg | aagcaggaag   | tcaaagagtt | 360 |
| ct | tccgctgg  | gcgcaggatc | acgtgaccga  | ggtggcgcat | gagttccacg   | tcagaaaggg | 420 |
| t  | gcgccaac  | aagagacccg | ccccgatga   | cgcggatata | agcgagccca   | agcgggcctg | 480 |
| cc | cctcagtc  | gcggatccat | cgacgtcaga  | cgcggaagga | gctccggtgg   | actttgccga | 540 |
| Ca | ggtaccaa  | aacaaatgtt | ctcgtcacgc  | gggcatgctt | cagatgctgt   | ttccctgcaa | 600 |
| ga | catgcgag  | agaatgaatc | agaatttcaa  | catttgcttc | acgcacggga   | ccagagactg | 660 |
| tt | cagaatgt  | ttccccggcg | tgtcagaatc  | tcaaccggtc | gtcagaaaga   | ggacgtatcg | 720 |
| ga | aactctgt  | gcgattcatc | atctgctggg  | gcgggctccc | gagattgctt   | gctcggcctg | 780 |
| cg | atctggtc  | aacgtggacc | tggatgactg  | tgtttctgag | caataaatga   | cttaaaccag | 840 |
| gt | atggctgc  | cgatggttat | cttccagatt  | ggctcgagga | caacctctct   | gagggcattc | 900 |
| gc | gagtggtg  | ggacttgaaa | cctggagccc  | cgaaacccaa | agccaaccag   | caaaagcagg | 960 |

0

|   | acgacggcc  | g gggtctggt  | g cttcctggc | t acaagtacc          | t cggaccctt  | c aacggactcg | 1020              |
|---|------------|--------------|-------------|----------------------|--------------|--------------|-------------------|
|   | acaaggggg  | a gcccgtcaa  | c gcggcggac | g ca <b>g</b> cggccc | t cgagcacga  | c asagcctacg | 1080              |
|   | accagcagc  | t caaagcggg1 | t gacaatccg | t acctgcggt          | a taatcacgc  | c gacgccgagt | 1140              |
|   | ttcaggagc  | g tctgcaagaa | a gatacgtcc | t ttgggggca          | a cctcgggcg  | a gcagtcttcc | 1200              |
|   | aggccaaga  | a gegggttete | gaacctctc   | g gtetggttg          | a ggaaggcgci | aagacggctc   | 1260              |
|   | ctggaaaga  | a gagaccggte | gagcagtcg   | c cacaagagc          | agactcctc    | tegggeateg   | 1320              |
|   | gcaagacag  | g ccagcagccc | gctaaaaag   | a gactcaatt          | tggtcagact   | ggcgactcag   | 1380              |
|   | agtcagtcc  | cgacccacae   | cctctcgga   | g aacctccago         | agccccctca   | ggtctgggac   | 1440              |
|   | ctaatacaat | ggcttcaggc   | ggtggcgct   | c caatggcaga         | caataacgaa   | ggcgccgacg   | 1500              |
|   | gagtgggtas | ttcctcggga   | aattggcatt  | gc <b>g</b> attccac  | atggctgggg   | gacagagtca   | 1560              |
|   | tcaccaccag | cacccgaacc   | tgggccctgd  | ccacctacaa           | caaccaccto   | tacaagcaaa   | 1620              |
| • | tctccaacgg | , cacctcggga | ggaagcacca  | acgacaacac           | ctattttggc   | tacagcacco   | 1680              |
|   | cctgggggta | ttttgacttc   | aacagatico  | actgreactt           | ttcaccacgt   | gactggcaac   | 1740              |
|   | gactcatcaa | caacaattgg   | ggattccggc  | ccaaaagact           | caacttcaag   | ctgttcaaca   | 1800              |
|   | tccaggtcaa | ggaagtcacg   | acgaacgaag  | gcaccaagac           | catcgccaat   | aatctcacca   | 1860              |
|   | gcaccgtgca | ggtctttacg   | gacttggagt  | accagttacc           | gtacgtgcta   | ggatccgctc   | 1920              |
|   | accagggatg | tetgeeteeg   | ttcccggcgg  | acgtetteat           | ggttcctcag   | tacggctatt   | 1980              |
|   | taactttaaa | caatggaagc   | caagccctgg  | gacgttcctc           | cttctactgt   | ctggagtatt   | 2040 (            |
|   | tcccatcgca | gatgccgaga   | accggcaaca  | actttcagtt           | cagetacace   | ttcgaggacg   | 2100              |
|   | tgcctttcca | cagcagctac   | gcgcacagcc  | agagcctgga           | caggctgatg   | aatcccctca   | 2160              |
|   | tcgaccagta | cctgtactac   | ctggtcagaa  | cgcaaacgac           | tggaactgga   | gggacgcaga   | 2220              |
|   | ctctggcatt | cagccaagcg   | ggtcctagct  | caatggccaa           | ccaggctaga   | aattgggtgc   | 2280              |
|   | ccggaccttg | ctaccggcag   | cagcgcgtct  | ccacgacaac           | caaccagaac   | aacaacagca   | 2340              |
|   | actttgcctg | gacgggagct   | gccaagttta  | agctgaacgg           | ccgagactct   | ctaatgaatc   | 2400              |
|   |            | aatggcttcc   |             |                      |              |              | 2460              |
|   | tcctgatttt | tggcaagcaa   | ggagccggga  | acgatggagt           | ggattacagc   | caagtgctga   | 2520              |
|   | ttacagatga | ggaagaaatc   | aaggctacca  | accccgtggc           | cacagaagaa   | tatggagcag   | 2580              |
|   | tggccatcaa | caaccaggcc   | gccaatacgc  | aggcgcagac           | cggactcgtg   | cacaaccagg   | 2640              |
|   | gggtgattcc | cggcatggtg   | tggcagaata  | gagacgtgta           | cctgcagggt   | cccatctggg   | 2700              |
|   | ccaaaattcc | tcacacggac   | ggcaactttc  | accegtetee           | cctgatgggc   | ggctttggac   | 2760              |
|   |            | gcctcctcaa   |             |                      |              |              | 2820 <sup>-</sup> |
|   | ttaccttcaa | ccaggccaag   | ctgaactctt  | tcatcacgca           | gtacagcacc   | ggacaggtca   | 2880              |
|   |            |              |             |                      |              |              |                   |

|             | gcgtggaaat cgagtgggag ctgcagaaag aaaacagcaa acgctggaat ccagagattc  | 2940 |
|-------------|--------------------------------------------------------------------|------|
|             | aatacactte caactactae aaatetacaa atgtggaett tgetgteaac aeggaaggag  | 3000 |
| 5           | tttatagega geetegeeee attggeacee gttaceteae eegeaacetg taattacatg  | 3060 |
|             | ttaatcaata aaccggttaa ttcgtttcag ttgaactttg gtctctgcga agggcgaatt  | 3120 |
|             | c ·                                                                | 3121 |
| 10          | 42405-45                                                           |      |
|             | <210> 45<br><211> 3122                                             |      |
|             | <212> DNA <213> new AAV serotype, clone 43.25                      |      |
| 15          |                                                                    |      |
|             | <400> 45                                                           |      |
|             | gaattegeee tttetaegge tgegteaact ggaccaatga gaacttteee tteaaegatt  | 60   |
| 20          | gcgtcgacaa gatggtgatc tggtgggagg agggcaagat gacggccaag gtcgtggagt  | 120  |
| ·           | ccgccaaggc cattctcggc ggcagcaagg tgcgtgtgga ccaaaagtgc aagtcttccg  | 180  |
|             | cccagatoga teccaccece gtgatogtca ectecaacae caacatgtge geogtgattg  | 240  |
| 25          | acgggaacag caccaccttc gagcaccagc agccgttgca ggaccggatg ttcaaatttg  | 300  |
|             | aactcacccg ccgtctggag catgactttg gcaaggtgac gaagcaggaa gtcaaagggt  | 360  |
|             | tetteegetg ggegeaggat caegtgaceg aggtggegea tgagtteeae gtgegageee  | 420  |
| <b>30</b> . | aagegggeet geeecteagt egeggateea tegaegteag accagaaagg gtggageeaa  | 480  |
|             | caagagaccc geceegatg acgeggatat aageggaagg ageteeggtg gaetttgeeg   | 540  |
|             | acaggtacca aaacaaatgt tetegteacg egggeatget teagatgetg ttteeetgea  | 600  |
| <i>35</i> . | agacatgcga gagaatgaat cagaatttca acatttgctt cacgcacggg accagagact  | 660  |
|             | gttcagaatg tttccccggc gtgtcagaat ctcaaccggt cgtcagaaag aggacgtatc  | 720  |
|             | ggaaactetg tgegatteat eatetgetgg ggegggetee egagattget tgeteggeet  | 780  |
| 40          | gcgatctggt caacgtggac ctggatgact gtgtttctga gcaataaatg acttaaacca  | 840  |
|             | ggtatggctg ccgatggtta tcttccagat tggctcgagg acaacctctc tgagggcatt  | 900  |
|             | cgcgagtggt gggacttgaa acctggagcc ccgaaaccca aagccaacca gcaaaagcag  | 960  |
| 45          | gacgacggcc ggggtctggt gcttcctggc tacaagtacc tcggaccctt caacggactc  | 1020 |
|             | gacaaggggg agcccgtcaa cgcggcggac gcagcggccc tcgagcacga caaagcctac  | 1080 |
|             | gaccagcage tcaaageggg tgacaateeg tacetgeggt ataateaege egaegeegag  | 1140 |
| 50          | tttcaggagc gtctgcaaga agatacgtct tttggggggca acctcgggcg agcagtcttc | 1200 |
|             | caggccaaga agcgggttct cgaacctctc ggtctggttg aggaaggcgc taagacggct  | 1260 |
|             | cctggaaaga agagaccggt agagcagtcg ccacaagagc cagactcctc ctcgggcatc  | 1320 |
| 55          | ggcaagacag gccagcagcc cgctaaaaag agactcaatt ttggtcagac tggcgactca  | 1380 |
|             | gagtcagtcc ccgacccaca acctctcgga gaacctccag cagccccctc aggtctggga  | 1440 |

|           | cctaatacaa tg  | gcttcagg   | cggtggcgct  | ccaatggcag   | acaataacga | aggcgccgac   | 1500  |
|-----------|----------------|------------|-------------|--------------|------------|--------------|-------|
|           | ggagtgggta at  | tcctcggg   | aaattggcat  | tgcgattcca   | catggctggg | ggacagagtc   | 1560  |
| 5         | atcaccacca go  | acccgaac   | ctgggccctg  | cccacctaca   | acaaccacct | : ctacaagcaa | 1620  |
|           | atctccaacg gc  | accteggg   | aggaagcacc  | aacgacaaca   | cctattttgg | ctacagcacc   | 1680  |
|           | ccctgggggt at  | tttgactt   | caacagattc  | cactgtcact   | tttcaccacg | tgactggcaa   | 1740  |
| 10        | cgactcatca ac  | aacaattg   | gggattccgg  | cccaaaagac   | tcaacttcaa | gctgttcaac   | 1800  |
|           | atccaggtca ag  | gaagtcac   | gacgaacgaa  | ggcaccaaga   | ccatcgccaa | taatctcacc   | 1860  |
| _         | agcaccgtgc ag  | gtctttac   | ggactcggag  | taccagttac   | cgtacgtgct | aggatccgct   | 1920  |
| 15        | caccagggat gt  | ctgcctcc   | gttcccggcg  | gacgtcttca   | tggttcctca | gtacggctat   | 1980  |
|           | ttaactttaa ac  | aatggaag   | ccaagccctg  | ggacgttcct   | ccttctactg | tctggagtat   | 2040  |
|           | ttcccatcgc aga | atgctgag a | aaccggcaac  | aactttcagt   | tcagctacac | cttcgaggac   | 2100  |
| 20        | gtgcctttcc aca | agcagcta ( | cgcgcacagc  | cagagcctgg   | acaggctgat | gaatcccctc   | 2160  |
|           | atcgaccagt acc | etgtacta d | cctggtcaga  | acgcaaacga   | ctggaactgg | agggacgcag   | 2220  |
| 95        | actitggiat to  | agccaagc ( | gggtcctagc  | tcaatggcca   | accaggctag | aaattgggtg   | 2280  |
| 25        | cccggacctt gct | accggca (  | gcagcgcgtc  | tccacgacaa   | ccaaccagaa | caacaacagc   | 2340  |
|           | aactttgcct gga | acgggagc t | tgccaagttt  | aagctgaacg   | gccgagactc | tctaatgaat   | 2400  |
| 30        | ccgggcgtgg cas | tggcttc c  | cacaaggat   | gacgacgacc   | gcttettecc | ttcgagcggg   | 2460  |
| 30        | gtcctgattt ttg | gcaagca a  | aggagccggg  | aacgatggag   | tggattacag | ccaagtgctg   | 2520° |
|           | attacagatg agg | maagaaat c | aaggctacc   | aaccccgtgg   | ccacagaaga | atatggagca   | 2580  |
| <i>35</i> | gtggccatca aca | accagge c  | gccaatacg   | caggcgcaga   | ccggactcgt | gcacaaccag   | 2640  |
|           | ggggtgattc ccg | gcatggt g  | tggcagaat   | agagacgtgt   | acctgcaggg | tcccatctgg   | 2700  |
|           | gccaaaattc ctc | acacgga c  | ggcaacttt   | cacccgtctc   | ccctgatggg | cggctttgga   | 2760  |
| 40        | ctgaagcacc cgc | ctcctca a  | attotoato   | aagaacacac   | cggttccagc | ggacccgccg   | 2820  |
|           | cttaccttca acc | aggccaa g  | ctgaactct 1 | ttcatcacgo   | agtacagcac | cggacaggtc   | 2880  |
|           | agcgtggaaa tcg | agtggga g  | ctgcagaaa q | gaaaacagca   | aacgctggaa | tccagagatt   | 2940  |
| 45        | caatacactt cca | actacta c  | aaatctaca a | aatgtggact   | ttgctgtcaa | cacggagggg   | 3000  |
| •         | gtttatagcg agc | ctegeee c  | attggcacc d | gttacctca (  | cccgcaacct | gtaattacat   | 3060  |
|           | gttaatcaat aaa | ccggtta a  | ttegtttea g | gttgaacttt ( | ggtctctgcg | aagggcgaat   | 3120  |
| 50        | tc             |            |             | •            |            |              | 3122  |

. <210> 46
<211> 3128
<212> DNA
<213> new AAV serotype, clone 44.1

<400> 46

|    | gaattcgcc  | c tttctacgg  | tgcgtcaact   | ggaccaatga   | . gaactttccc | ttcaacgatt | 60   |
|----|------------|--------------|--------------|--------------|--------------|------------|------|
|    | gcgtcgaca  | a gatgttgato | tggtgggagg   | g agggcaagat | gacggccaag   | gtcgtggagt | 120  |
| 5  | ccgccaagg  | cattctcgg    | ggcagcaaag   | ; tgcgcgtgga | ccaaaagtgc   | aagccgtccg | 180  |
|    | cccagatcg  | A cccacccc   | gtgatcgtca   | cctccaacac   | caacatgtgc   | gccgtgattg | 240  |
|    | acgggaacag | g caccacctto | : gagcaccago | agccgttgcg   | ggaccggatg   | ttcaagtttg | 300  |
| 10 | aactcaccc  | g ccgtctggag | cacgactttg   | gcaaggtgac   | aaagcaggaa   | gtcagagagt | 360  |
|    | tottocgoto | ggcgcaggat   | cacgtgaccg   | aggtggcgca   | cgagttctac   | gtcagaaagg | 420  |
|    | gtggagccae | a caagagacco | gccccgatg    | acgcggataa   | aagcgagccc   | aagcgggcct | 480  |
| 15 | gcccctcagt | : cgcggatcca | tcgacgtcag   | acgcggaagg   | agctccggtg   | gactttgccg | 540  |
|    | acaggtacca | aaacaaatgt   | totogtcacg   | cgggcatgct   | tcagatgctg   | tttccctgca | 600  |
|    | aaacatgcga | gagaatgaat   | cagaatttca   | acatttgctt   | cacgcacggg   | accagagact | 660  |
| 20 | gttcagaatg | tttccccggc   | gtgtcagaat   | ctcaaccggt   | cgtcagaaaa   | aagacgtatc | 720  |
|    | ggaaactctg | tgcgattcat   | catctgctgg   | ggcgggcacc   | cgagattgct   | tgctcggcct | 780  |
|    | gegatetggt | caacgtggac   | ctagatgact   | gtgtttctga   | gcaataaatg   | acttaaacca | 840  |
| 25 | ggtatggctg | ccgatggtta   | tcttccagat   | tggctcgagg   | acaacctctc   | tgagggcatt | 900  |
|    | cgcgagtggt | gggacttgaa   | acctggagcc   | ccgaaaccca   | aagccaacca   | gcaaaagcag | 960  |
|    | gacgacggcc | ggggtctggt   | gcttcctggc   | tacaagtacc   | toggaccott   | caacggactc | 1020 |
| 30 | gacaaggggg | agcccgtcaa   | cgcggcggac   | gcagcggccc   | tcgagcacga   | caeggcctac | 1080 |
|    | gaccagcagc | tcaaagcggg   | tgacaatccg   | tacctgcggt   | ataaccacgc   | cgacgccgag | 1140 |
|    | tttcaggagc | gtctgcaaga   | agatacgtct   | tttgggggca   | acctcgggcg   | agcagtcttc | 1200 |
| 35 | caggccaaga | agcgggttct   | cgaacctctc   | ggtctggttg   | aggaaggcgc   | taagacggct | 1260 |
|    | cctggaaaga | agagaccggt   | agagccatca   | ccccagcgtt   | ctccagactc   | ctctacgggc | 1320 |
|    | atcggcaaga | aaggccagca   | gcccgcgaaa   | aagagactca   | actttgggca   | gactggcgac | 1380 |
| 40 | tcagagtcag | tgcccgaccc   | tcaaccaatc   | ggagaacccc   | ccgcaggccc   | ctctggtctg | 1440 |
|    | ggatctggta | caatggctgc   | aggcggtggc   | gctccaatgg   | cagacaataa   | cgaaggcgcc | 1500 |
| 45 | gacggagtgg | gtagttcctc   | aggaaattgg   | cattgcgatt   | ccacatggct   | gggcgacaga | 1560 |
| 45 | gtcatcacca | ccagcacccg   | aacctgggcc   | ctccccacct   | acaacaacca   | cctctacaag | 1620 |
|    | caaatctcca | acgggacttc   | gggaggaagc   | accaacgaca   | acacctactt   | cggctacagc | 1680 |
| 50 | acccctggg  | ggtattttga   | ctttaacaga   | ttccactgcc   | acttctcacc   | acgtgactgg | 1740 |
| 50 | cagcgactca | tcaacaacaa   | ctggggattc   | cggcccaaga   | gactcaactt   | caagctcttc | 1800 |
|    | aacatccagg | tcaaggaggt   | cacgcagaat   | gaaggcacca   | agaccatcgc   | caataacctt | 1860 |
| EE | accagcacga | ttcaggtctt   | tacggactcg   | gaataccagc   | tcccgtacgt   | cctcggctct | 1920 |
| 55 |            |              |              |              |              |            |      |

|    | gcgcaccagg gctgcctgcc tccgttcccg gcggacgtct tcatgattcc tcagtacggg | 1980  |
|----|-------------------------------------------------------------------|-------|
|    | tacctgactc tgaacaatgg cagtcaggcc gtgggccgtt cetectteta etgectggag | 2040  |
| 5  | tactttcctt ctcaaatgct gagaacgggc aacaactttg agttcagcta ccagtttgag | 2100  |
|    | gacgtgcctt ttcacagcag ctacgcgcac agccaaagcc tggaccggct gatgaacccc | 2160  |
| •  | ctcatcgacc agtacctgta ctacctgtct cggactcagt ccacgggagg taccgcagga | 2220  |
| 10 | acteageagt tgctattttc teaggeeggg cetaataaca tgteggetea ggccaaaaac | 2280  |
|    | tggctacccg ggccctgcta ccggcagcaa cgcgtctcca cgacactgtc gcaaaataac | 2340  |
|    | aacagcaact gtaaatcccg gtgtcgctat ggcaacccac aaggacgacg aagagcgatt | 2400  |
| 15 | ttgcctggac cggtgccacc aagtatcatc tgaatggcag agactctctg ttttccgtcc | 2460  |
|    | agoggagtot taatgtttgg gaaacaggga gotggaaaag acaacgtgga ctatagcago | 2520  |
|    | gttatgctaa ccagtgagga agaaattaaa accaccaacc cagtggccac ggaacagtac | 25,80 |
| 20 | ggcgtggtgg ccgataacct gcaacagcaa aacgccgctc ctattgtagg ggccgtcaac | 2640  |
|    | agtcaaggag cottacctgg catggtotgg cagaaccggg acgtgtacct gcagggtoot | 2700  |
|    | atctgggcca agattectca caeggaegga aaettteate eetegeeget gatgggagge | 2760  |
| 25 | tttggactga aacacccgcc tcctcagatc ctgattaaga atacacctgt tcccgcggat | 2820  |
|    | cctccaacta ccttcagtca agctaagctg gcgtcgttca tcacgcagta cagcaccgga | 2880  |
|    | caggtcagcg tggaaattga atgggagctg cagaaagaaa acagcaaacg ctggaaccca | 2940  |
| 30 | gagattcaat acacttccaa ctactacaaa tctacaaatg tggacttcgc tgttaacaca | 3000  |
|    | gatggcactt attetgagee tegececatt ggcaccegtt aceteacceg taatetgtaa | 3060  |
| _  | ttgctcgtta atcaataaac cggttgattc gtttcagttg aactttggtc tctgcgaagg | 3120  |
| 35 | gcgaattc                                                          | 3128  |
|    | <210> 47                                                          |       |
|    | <211> 3128                                                        |       |
|    | <212> DNA <213> new AAV serotype, clone 44.5                      |       |
|    |                                                                   |       |
|    | <400> 47                                                          |       |
| 5  | gaattegeee tttetaegge tgegteaact ggaceaatga gaacttteee tteaacgatt | 60    |
|    | gcgtcgacaa gatggtgatc tggtgggagg agggcaagat gacggccaag gtcgtggagt | 120   |
|    | ccgccaagge cattetegge ggcagcaaag tgegegtgga ccaaaagtge aagtegteeg | 180   |
| 0  | cccagatcga ecceaccee gtgategtea ecteeaacae caacatgtge geegtgattg  | 240   |
|    | acgggaacag caccacette gageaceage ageegttgea ggaeeggatg tteaagtttg | 300   |
|    | aactcacccg ccgtctggag cacgactttg gcaaggtgac aaagcaggaa gtcagagagt | 360   |
| 5  | tetteegetg ggegeaggat caegtgaceg aggtggegea egagttetae gteagaaagg | 420   |
|    | gtggagccaa caagagaccc gcccccgatg acgcggataa aagcgagccc aagcgggcct | 480   |

| gccctcag   | cgcggatcca   | tcgacgtca    | g acgcggaagg | g ageteeggt | g gactttgccg | 540    |
|------------|--------------|--------------|--------------|-------------|--------------|--------|
| acaggtacca | a aaacaaatgt | tctcgtcac    | g cgggcatgct | tcagatgct   | ; tttccctgca | 600    |
| aaacatgcga | a gagaatgaat | : cagaatttca | a acatttgctt | cacgcacgg   | g accagagact | . 660  |
| gttcagaatq | tttccceggc   | gtgtcagaat   | ctcaaccggt   | tgtcagaaa   | aagacgtatc   | 720    |
| ggaaactctg | tgcgattcat   | catctgctgg   | ggcgggcacc   | cgagattgct  | tgctcggcct   | 780    |
| gcgatctggt | caacgtggac   | ctagatgact   | gtgtttctga   | gcaataaatg  | acttaaacca   | 840    |
| ggtatggctg | ccgatggtta   | tettecagat   | tggctcgagg   | acaacctctc  | tgagggcatt   | 900    |
| cgcgagtggt | gggacttgaa   | acctggagco   | ccgaaaccca   | aagccaacca  | gcaaaagcag   | 960    |
| gacgacggcc | ggggtctggt   | getteetgge   | tacaagtacc   | toggaccott  | caacggactc   | 1020   |
| gacaaggggg | agcccgtcaa   | cgcggcggac   | gcagcggccc   | tcgagcacga  | caaggcctac   | 1080   |
| gaccagcagc | tcaaagcggg   | tgacaatccg   | tacctgcggt   | ataaccacgc  | cgacgccgag   | 1140   |
| tttcaggagc | gtctgcaaga   | agatacgtct   | tttgggggca   | acctcgggcg  | agcagtcttc   | 1200   |
| caggccaaga | agcgggttct   | cgaacctctc   | ggtctggttg   | aggaaggcgc  | taagacggct   | 1260   |
| cctggaaaga | agagaccggt   | agagccatca   | ccccagcgtt   | ctccagactc  | ctctacgggc   | 1320   |
| atcggcaaga | aaggccagca   | gcccgcgaaa   | aagagactca   | actttgggca  | gactggcgac   | 1380   |
| tcagagtcag | tgcccgaccc   | tcaaccaatc   | ggagaacccc   | ccgcaggccc  | ctctggtctg   | 1440   |
| ggatetggta | caatggctgc   | aggcggtggc   | gctccaatgg   | cagacaataa  | cgaaggcgcc   | 1500   |
| gacggagtgg | gtagttcctc   | aggaaattgg   | cattgcgatt   | ccacatggct  | gggcgacaga   | 1560   |
| gtcatcacca | ccagcacccg   | aacctgggcc   | ctccccacct   | acaacaacca  | cctctacaag   | 1620   |
| caaatctcca | acgggacttc   | gggaggaagc   | accaacgaca   | acacctactt  | cggctacagc   | 1680   |
| accccctggg | ggtattttga   | ctttaacaga   | ttccactgcc   | acttctcacc  | acgtgactgg   | 1740   |
| cagcgactca | tcaacaacaa   | ctggggattc   | cggcccaaga   | gacccaactt  | caagctcttc   | 1800   |
| aacatccagg | tcaaggaggt   | cacgcagaat   | gaaggcacca   | agaccatcgc  | caataacctt   | 1860   |
| accagcacga | ttcaggtctt   | tacggactcg   | gaataccagc   | tcccgtacgt  | cctcggctct   | 1920   |
|            | gctgcctgcc   |              |              |             |              | 1980   |
| tacctgactc | tgaacaatgg   | cagtcaggcc   | gtgggccgtt   | cctccttcta  | ctgcctggag   | 2040   |
| tactttcctt | ctcaaatgct   | gagaacgggc   | aacaactttg   | agttcagcta  | ccagtttgag   | 2100   |
| gacgtgcctt | ttcacagcag   | ctacgcgcac   | agccaaagcc   | tggaccggct  | gatgaacccc   | 2160   |
| ctcatcgacc | agtacctgta   | ctacctgtct   | cggactcagt   | ccacgggagg  | tacegcagga   | 2220   |
| actcagcagt | tgctattttc   | tcaggccggg   | cctaataaca   | tgtcggctca  | ggccaaaaac   | 2280   |
| tggctacccg | ggccctgcta   | ccggcagcaa   | cgcgtctcca   | cgacactgtc  | gcaaaataac   | 2340 · |
| aacagcaact | ttgcctggac   | cggtgccacc   | aagtatcatc   | tgaatggcag  | agactctctg   | 2400   |
|            |              |              |              |             |              |        |

|   | gtaaatcccg | gtgtcgctat | ggcaacccac | aaggacgacg | aagagcgatt | ttttccgtcc | 2460 |
|---|------------|------------|------------|------------|------------|------------|------|
|   | agcggagtct | taatgtttgg | gaaacaggga | gctggaaaag | acaacgtgga | ctatagcagc | 2520 |
|   | gttatgctaa | ccagtgagga | agaaattaaa | accaccaacc | cagtggccac | agaacagtac | 2580 |
|   | ggcgtggtgg | ccgataacct | gcaacagcaa | aacgccgctc | ctattgtagg | ggccgtcaac | 2640 |
|   | agtcaaggag | ccttacctgg | catggtctgg | cagaaccggg | acgtgtacct | gcagggtcct | 2700 |
|   | atctgggcca | agattcctca | cacggacgga | aactttcatc | cctcgccgct | gatgggaggc | 2760 |
|   | tttggactga | aacacccgcc | tcctcagatc | ctgattaaga | atacacctgt | tcccgcggat | 2820 |
|   | cctccaacta | ccttcagtca | agctaagctg | gcgtcgttca | tcacgcagta | cagcaccgga | 2880 |
|   | caggtcagcg | tggaaattga | atgggagctg | cagaaagaaa | acagcaaacg | ctggaaccca | 2940 |
|   | gagattcaat | acacttccaa | ctactacaaa | tctacaaatg | tggactttgc | tgttaacaca | 3000 |
|   | gatggcactt | attctgagcc | togoccoatt | ggcacccgtt | acctcacccg | taatctgtaa | 3060 |
|   | ttgcttgtta | atcaataaac | cggttgattc | gtttcagttg | aactttggtc | tctgcgaagg | 3120 |
| - | gcgaattc   |            |            |            |            |            | 3128 |
|   |            |            |            |            |            |            |      |

25

20

5

10

15

<210> 48

<211> 1933

<212> DNA

<213> new AAV serotype, clone 223.10

30

<220> <221> misc\_feature

<222> (1302)..(1302)

<223> can be a, c, g or t

<400> 48

40

35

45

50

|   | caaggcctac | gaccagcagc | tcaaagcggg | tgacaatccg | tacctgcggt | ataaccacgc | 6   |
|---|------------|------------|------------|------------|------------|------------|-----|
|   | cgacgccgag | tttcaggagc | gtcttcaaga | agatacgtct | tttgggggca | acctcgggcg | 12  |
|   | agcagtcttc | caggccaaaa | agcgggttct | cgaacctctt | ggtctggttg | agacgccagc | 18  |
|   | taagacggca | cctggaaaga | agcgaccggt | agactcgcca | gactccacct | cgggcatcgg | 240 |
|   | caagaaaggc | cagcagcccg | cgaaaaagag | actcaacttt | gggcagactg | gcgactcaga | 300 |
|   | gtcagtcccc | gaccctcaac | caatcggaga | accaccagca | ggcccctctg | gtctgggatc | 360 |
|   | tggtacaatg | gctgcaggcg | gtggcgcacc | aatggctgac | aataacgagg | gcgccgacgg | 420 |
| • | agtgggtaat | gcctcaggaa | attggcattg | cgattccaca | tggctgggcg | acagagtcat | 480 |
|   | caccaccagc | acccgaacct | gggccctgcc | Cacctacaac | aaccacctct | acaagcaaat | 540 |
| • | ctccagtcag | tcagcaggga | gcaccaacga | taacgtctat | ttcggctaca | gcaccccctg | 600 |
| ( | ggggtatttt | gacttcaaca | gattccattg | ccacttctca | ccacgtgact | ggcagcgact | 660 |
| 1 | tatcaacaac | aactggggat | tccggcccaa | gaagctcaac | ttcaagctct | tcaacatcca | 720 |
| ç | gtcaaggag  | gtcacgacga | atgacggtgt | cacaaccatc | gctaataacc | ttaccagcac | 780 |

|    | 55         | - 0000099000 | . oggaatacce | a accyclycat | giccicgget   | . ccgcgcacca | 84   |
|----|------------|--------------|--------------|--------------|--------------|--------------|------|
| _  | gggctgcctg | g cctccgttcc | : cggcagacgt | gttcatgati   | ccgcagtacg   | gatacctgac   | 90   |
| 5  | tctgaacaat | ggcagccaat   | cggtaggccg   | tteeteette   | : tactgcctgg | agtactttcc   | 96   |
|    | ttctcagato | g ctgagaacgg | gcaacaactt   | cacctttage   | : tacaccttcg | aggacgtgcc   | 102  |
|    | tttccacago | agctacgcgc   | acagccagag   | tctggaccgg   | ctgatgaatc   | ccctcatcga   | 108  |
| 10 | ccagtacctg | tactacttgg   | ccagaacaca   | gagcaacgca   | ggaggtactg   | ctggcaatcg   | 1140 |
|    | ggaactgcag | tittatcagg   | gcggacctac   | caccatggcc   | gaacaagcaa   | agaactggct   | 1200 |
|    | gcccggacct | tgcttccggc   | aacagagagt   | atccaagacg   | ctggatcaaa   | ataacaacag   | 1260 |
| 15 | caactttgcc | tggactggtg   | ccacaaaata   | ccatttaaat   | gnaagaaatt   | cattggttaa   | 1320 |
|    | tcccggtgtc | gccatggcaa   | cccacaagga   | cgacgaggaa   | cgcttcttcc   | cttcgagcgg   | 1380 |
| 20 | agttctaatt | tttggcaaaa   | ctggagcagc   | taataaaact   | acattagaaa   | acgtgctcat   | 1440 |
| 20 | gacaaatgaa | gaagaaattc   | gtcctaccaa   | cccggtagct   | accgaggaat   | acgggattgt   | 1500 |
|    | aagcagcaac | ttgcaggcgg   | ctagcaccgc   | agcccagaca   | caagttgtta   | acaaccaggg   | 1560 |
| 25 | agcettacct | ggcatggtct   | ggcagaaccg   | ggacgtgtac   | ctgcaaggtc   | ccatttgggc   | 1620 |
| 23 | caagattcct | cacacggacg   | gcaactttca   | cccgtctcct   | ctaatgggtg   | gctttggact   | 1680 |
|    | gaaacacccg | cctcccaga    | tcctgatcaa   | aaacacaccg   | gtacctgcta   | atcctccaga   | 1740 |
| 30 | agtgtttact | cctgccaagt   | ttgcttcctt   | catcacgcag   | tacagcaccg   | ggcaagtcag   | 1800 |
| 55 | cgttgagatc | gagtgggagc   | tgcagaaaga   | gaacagcaag   | cgctggaacc   | cagagattca   | 1860 |
|    | gtacacctcc | aactttgaca   | aacagactgg   | agtggacttt   | gctgttgaca   | gccagggtgt   | 1920 |
| 35 | ttactctgag | cct          |              |              |              |              | 1933 |
|    |            |              |              |              |              |              |      |

<210> 49

<211> 1933

<212> DNA

<213> new AAV serotype, cione 223.2

<400> 49

50

40

45

| caaggcctac | gaccagcagc | tcaaagcggg | tgacaatccg | tacctgcggt | ataaccacgc | 60  |
|------------|------------|------------|------------|------------|------------|-----|
| cgacgccgag | tttcaggagt | gtcttcaaga | agatacgtct | tttgggggca | acctcgggcg | 120 |
| agcagtcttc | caggccaaaa | agcgggttct | cgaacctctt | ggtctggttg | agacgccagc | 180 |
| taagacggca | cctggaaaga | agcgaccggt | agactegeca | gactccacct | cgggcatcgg | 240 |
| caagaaaggc | cagcagcccg | cgaaaaagag | actcaacttt | gggcagactg | gcgactcaga | 300 |
| gtcagtcccc | gaccctcaac | caatcggaga | accaccagca | ggcccctctg | gtctgggatc | 360 |
| tggtacaatg | gttgcaggcg | gtggcgcacc | aatggctgac | aataacgagg | gcgccgacgg | 420 |
| agtgggtaat | gcctcaggaa | attggcattg | cgattccaca | tggctgggcg | acagagtcat | 480 |
| caccaccagc | acccgaacct | gggccctgcc | cacctacaac | aaccacctct | acaagcaaat | 540 |

|    | ctccagtcag tcagcaggga gcaccaacga taacgtctat ttcggctaca gcacccctg  | 600  |
|----|-------------------------------------------------------------------|------|
| 5  | ggggtatttt gacttcaaca gattccattg ccacttctca ccacgtgact ggcagcgact | 660  |
|    | tatcaacaac aactggggat tccggcccaa gaagctcaac ttcaagctct tcaacatcca | 720  |
|    | ggtcaaggag gtcacgacga atgacggtgt cacaaccatc gctaataacc ttaccagcac | 780  |
| 10 | ggttcaggtc ttttcggact cggaatatca actgccgtac gtcctcggct ccgcgcacca | 840  |
|    | gggctgcctg cctccgttcc cggcagacgt gttcatgatt ccgcagtacg gatacctgac | 900  |
|    | totgaacaat ggcagocaat oggtaggoog ttootcotto tactgootgg agtactttoo | 960  |
| 15 | ttctcagatg ctgagaacgg gcaacaactt cacctttagc tacaccttcg aggacgtgcc | 1020 |
|    | tttccacagc agctacgcgc acagccagag tctggaccgg ctgatgaatc ccctcatcga | 1080 |
|    | ccagtacctg tactacttgg ccagaacaca gagcaacgca ggaggtactg ctggcaatcg | 1140 |
| 20 | ggaactgcag ttttatcagg gcggacctac caccatggcc gaacaagcaa agaactggct | 1200 |
|    | gcccggacct tgcttccggc aacagagagt atccaagacg ctggatcaaa ataacaacag | 1260 |
|    | caactttgcc tggactggtg ccacaaaata ccatttaaat ggaagaaatt cattggttaa | 1320 |
| 25 | teceggtgte gecatggeaa eecacaagga egacgaggaa egetteteee ettegagegg | 1380 |
|    | agttctaatt tttggcasaa ctggagcagc taataaaact acattagaaa acgtgctcat | 1440 |
|    | gacaaatgaa gaagaaatto gtootaccaa cooggtagot acogaggaat acgggattgt | 1500 |
| 30 | aagcagcaac ttgcaggcgg ctagcaccgc agcccagaca caagttgtta acaaccaggg | 1560 |
|    |                                                                   | 1620 |
|    | caagatteet cacaeggaeg geaactttea ecegteteet etaatgggtg getttggaet | 1680 |
| 35 | gaaacacccg cetececaga teetgateaa aaacaegeeg gtacetgeta ateeteeaga | 1740 |
|    | agtgtttact cotgocaagt ttgcttcctt catcacgcag tacagcaccg ggcaagtcag | 1800 |
|    | cgttgagatc gagtgggagc tgcagaaaga gaacagcaag cgctggaacc cagagattca | 1860 |
| 40 | gtacacctcc aactttgaca aacagactgg agtggacttt gctgttgaca gccagggtgt | 1920 |
|    | ttactctgag cct                                                    | 1933 |

<210> 50 45

<211> 1933

<212> DNA

<213> new AAV serotype, clone 223.4

<400> 50

55

|    | caaggeetae gaccageage teaaageggg tgacaateeg tacetgeggt ataaceaege | 60   |
|----|-------------------------------------------------------------------|------|
| 5  | cgacgccgag tttcaggagc gtcttcaaga agatacgtct tttgggggca acctcgggcg | 120  |
|    | agcagtette caggecaaaa agegggttet egaacetett ggtetggttg agaegecage | 180  |
|    | taagacggca cctggaaaga agcgaccggt agactcgcca gactccacct cgggcatcgg | 240  |
|    | caagaaaggc cagcagcccg cgaaaaagag actcaacttt gggcagactg gcgactcaga | 300  |
| 10 |                                                                   |      |
|    | gccagtcccc gaccetcaac caatcggaga accaecagca ggcccctctg gtctgggatc | 360  |
|    | tggtacaatg getgeaggeg gtggegeace aatggetgae aataaegagg gegeegaegg | 420  |
| 15 | agtgggtaat gcctcaggaa attggcattg cgattccaca cggctgggcg acagagtcat | 480  |
|    | caccaccage accegaacet gggeeetgee cacctacaae aaccacetet acaagcaaat | 540  |
|    | ctccagtcag tcagcaggga gcaccaacga taacgtctat ttcggctaca gcaccccctg | 600  |
| 20 | ggggtatttt gacttcaaca gattccattg ccacttctca ccacgtgact ggcagcgact | 660  |
|    | tatcaacaac aactggggat teeggeecaa gaageteaae tteaagetet teaacateea | 720  |
|    | ggtcaaggag gtcacgacga atgacggcgt cacaaccatc gctaataacc ttaccagcac | 780  |
| 25 | ggttcaggtc ttttcggact cggaatatca actgccgtac gtcctcggct ccgcgcacca | 840  |
|    | gggctgcctg cctccgttcc cggcagacgt gttcatgatt ccgcagtacg gatacctgac | 900  |
|    | totgaacaat ggcagocaat oggtaggoog trootcotto tactgootgg agtactttoo | 960  |
| 30 | ttctcagatg ctgagaacgg gcaacaactt cacctttagc tacaccttcg aggacgtgcc | 1020 |
|    | tttccacage agetaegege acagecagag tetgggeegg etgatgaate eceteatega | 1080 |
|    | ccagtacctg tactacttgg ccagaacaca gagcaacgca ggaggtactg ctggcaatcg | 1140 |
| 35 | ggaactgcag ttttatcagg gcggacctac caccatggcc gaacaagcaa agaactggct | 1200 |
|    | gcccggacct tgcttccggc aacagagagt atccaagacg ctggatcaaa ataacaacag | 1260 |
| 40 | caactttgcc tggactggtg ccacaaaata ccatttaaat ggaagaaatt cattggttaa | 1320 |
| 40 | teceggigie gecaiggeaa eccaeaagga egaegaggaa egettettee ettegagegg | 1380 |
|    | agttctaatt tttggcaaaa ctggagcagc taataaaact acattagaaa acgtgctcat | 1440 |
| 45 | gacaaatgaa gaagaaatto gtootaccaa cooggtagot acogaggaat acgggattgt | 1500 |
| 43 | aagcagcaac ttgcaggcgg ctagcaccgc agcccagaca caagttgtta acaaccaggg | 1560 |
|    | agcottacet ggcatggtot ggcagaaceg ggacgtgtac etgcaaggto coatttgggo | 1620 |
| 50 | caagatteet cacaeggaeg geaactttea ecegteteet etaatgggtg getttggaet | 1680 |
| 50 | gaaacacccg cetecccaga teetgatcaa aaacacaccg gtacetgeta ateetecaga | 1740 |
| 55 | agtgtttact cotgocaagt ttgcttcctt catcacgcag tacagcaccg ggcaagtcag | 1800 |
|    | cgttgagatc gaatgggagc tgcagaaaga gaacagcaag cgctggaacc cagagattca | 1860 |
|    | gtacacctcc aactttgaca aacagactgg agtggacttt gctgttgaca gccagggtgt | 1920 |
|    | ttactctgag cct                                                    | 1933 |
|    |                                                                   |      |

|           | EP 1 310 571 B1                                                            |    |  |  |  |  |
|-----------|----------------------------------------------------------------------------|----|--|--|--|--|
| 5         | <210> 51<br><211> 1933<br><212> DNA<br><213> new AAV serotype, clone 223.5 |    |  |  |  |  |
| 3         | <400> 51                                                                   |    |  |  |  |  |
| 10        | caaggeetae gaccageage teaaageggg tgacaateeg tacetgeggt ataaccaege          | 60 |  |  |  |  |
|           |                                                                            |    |  |  |  |  |
| 15        |                                                                            |    |  |  |  |  |
|           |                                                                            |    |  |  |  |  |
| 20        |                                                                            |    |  |  |  |  |
|           |                                                                            |    |  |  |  |  |
| 25        |                                                                            | •  |  |  |  |  |
| <i>30</i> |                                                                            |    |  |  |  |  |
|           |                                                                            |    |  |  |  |  |

|    | cgacgccgag tttcaggagc gtcttcaaga agatacgtct ttt   | gggggca acctcgggcg 1   | 20 |
|----|---------------------------------------------------|------------------------|----|
|    | agcagtette caggecaaaa agegggttet egaacetett ggt   | ctggttg agacgccagc 1   | 80 |
| 5  | taagacggca cotggaaaga agcgaccggt agactcgcca gac   | tccacct cgggcatcgg 2   | 40 |
|    | caagaaaggc cagcagcccg cgaaaaagag actcaacttt ggg   | cagactg gcgactcaga 3   | 00 |
| ,  | gccagtcccc gaccctcaac caatcggaga accaccagca ggc   | coctotg gtotgggatc 3   | 60 |
| 10 | tggtacaatg gctgcaggcg gtggcgcacc aatggctgac aata  | aacgagg gcgccgacgg 4:  | 20 |
|    | agtgggtaat gcctcaggaa attggcattg cgattccaca cgg   | ctgggcg acagagtcat 4   | 80 |
| 45 | caccaccage accegaacet gggccetgee cacctacaac aac   | cacctct acaagcaaat 5   | 10 |
| 15 | ctccagtcag tcagcaggga gcaccaacga taacgtctat ttcc  | ggctaca gcaccccctg 60  | 00 |
|    | ggggtatttt gacttcaaca gattccattg ccacttctca ccac  | gtgact ggcagcgact 66   | 50 |
| 20 | tatcaacaac aactggggat teeggeecaa gaageteaac ttea  | agetet teaacateca 72   | 0  |
| 20 | ggtcaaggag gtcacgacga atgacggcgt cacaaccatc gcta  | ataacc ttaccagcac 78   | 0  |
|    | ggttcaggtc ttttcggact cggaatatca actgccgtac gtcc  | togget cogogoacca 84   | 0  |
| 25 | gggctgcctg cctccgttcc cggcagacgt gttcatgatt ccgc  | agtacg gatacctgac 90   | 0  |
|    | totgaacaat ggcagocaat oggtaggoog trootcotto tact  | gcctgg agtactttcc 96   | 0  |
|    | ttctcagatg ctgagaacgg gcaacaactt cacctttagc taca  | ccttcg aggacgtgcc 102  | 0  |
| 30 | tttccacage agetacgege acagecagag tetgggeegg etga  | tgaatc ccctcatcga 108  | 0  |
|    | ccagtacctg tactacttgg ccagaacaca gagcaacgca ggag  | gtactg ctggcaatcg 114  | 0  |
|    | ggaactgcag ttttatcagg gcggacctac caccatggcc gaac  | aagcaa agaactggct 120  | 0  |
| 35 | gcccggacct tgcttccggc aacagagagt atccaagacg ctgg  | atcasa atascascag 126  | 0  |
|    | caactttgcc tggactggtg ccacaaaata ccatttaaat ggaa  | gaaatt cattggttaa 132  | 0  |
|    | tcccggtgtc gccatggcaa cccacaagga cgacgaggaa cgct  | tottoc ottogagogg 138  | 0  |
| 40 | agttctaatt tttggcaaaa ctggagcagc taataaaact acat  | tagaaa acgtgctcat 1440 | )  |
|    | gacaaatgaa gaagaaatto gtootaccaa cooggtagot acog  | aggaat acgggattgt 1500 | )  |
|    | aagcagcaac ttgcaggcgg ctagcaccgc agcccagaca caagt |                        | )  |
| 45 | agcettacet ggcatggtet ggcagaaceg ggacgtgtae etgca | aaggtc ccatttgggc 1620 | )  |
|    | caagatteet cacaeggaeg geaactttea eeegteteet etaat | gggtg gctttggact 1680  | )  |
|    | gaaacacccg cctccccaga tcctgatcaa aaacacaccg gtacc | tgcta atcctccaga 1740  | )  |
| 50 | agtgtttact cctgccaagt ttgcttcctt catcacgcag tacag | caccg ggcaagtcag 1800  | )  |
|    | cgttgagatc gaatgggagc tgcagaaaga gaacagcaag cgctg | gaacc cagagattca 1860  | )  |
|    | gtacacetee aactttgaca aacagactgg agtggacttt getgt | tgaca gccagggtgt 1920  | I  |
| 55 | ttactctgag cct                                    | 1933                   |    |

<211> 1933

<212> DNA

<213> new AAV serotype, clone 223.6

<400> 52

| •  | caaggeetae gaccagcage teaaageggg tgacaateeg tacetgeggt ataaccaege   | 60   |
|----|---------------------------------------------------------------------|------|
| 10 | cgacgccgag tttcaggagc gtcttcaaga agatacgtct tttggggggca acctcgggcg  | 120  |
|    | agcagtette caggecaaaa agegggttet egaacetett ggtetggttg agaegecage   | 180  |
|    | taagacggca cctggaaaga agcgaccggt agactcgcca gactccacct cgggcatcgg   | 240  |
| 15 | caagaaaggc cagcagcccg cgaaaaagag actcaacttt gggcagactg gegactcaga   | 300  |
|    | gtcagtcccc gaccetcaac caateggaga accaecagea ggeceetetg gtetgggate   | 360  |
|    | tggtacaatg gctgcaggcg gtggcgcacc aatggctgac aatagcgagg gcgccgacgg   | 420  |
| 20 | agtgggtaat gcctcaggaa attggcattg cgattccaca tggctgggcg acagagtcat   | 480  |
|    | caccaccage accegaacet gggecetgee cacetacaae aaccacetet acaagcaaat   | 540  |
|    | ctccagtcag tcagcaggga gcaccaacga taacgtctat ttcggctaca gcaccccctg   | 600  |
| 25 | ggggtatttt gacttcaaca gattccattg ccacttctca ccacgtgact ggcagcgact   | 660  |
|    | tatcaacaac aactggggat tooggcocaa gaagotcaac ttcaagotot tcaacatoca   | 720  |
|    | ggtcaaggag gtcacgacga atgacggtgt cacaaccatc gctaataacc ttaccagcac   | 780  |
| 30 | ggttcaggtc ttttcggact cggaatatca actgccgtac gtcctcggct ccgcgcacca   | 840  |
|    | gggctgcctg cctccgttcc cggcagacgt gttcatgatt ccgcagtacg gatacctgac   | 900  |
|    | totgaacaat ggcagocaat eggtaggeeg treeteette taetgeetgg agtaetttee   | 960  |
| 35 | tteteagatg etgagaaegg geaacaaett cacetttage tacacetteg aggaegtgee   | 1020 |
|    | tttccacage agetacgege acagecagag tetggacegg etgatgaate eceteatega   | 1080 |
|    | ccagtacctg tactacttgg ccagaacaca gagcaacgca ggaggtactg ctggcaatcg   | 1140 |
| 40 | ggaactgcag ttttatcagg gcggacctac caccatggcc gaacaagcaa agaactggct   | 1200 |
|    | gcccggacct tgcttccggc aacagagagt atccaagacg ctggatcaaa ataacaacag   | 1260 |
|    | caactttgcc tggactggtg ccacaaaata ccatttaaat ggaagaaatt cattggttaa ] | 1320 |
| 45 | tcccggtgtc gccatggcaa cccacaagga cgacgaggaa cgcttcttcc cttcgagcgg ] | 1380 |
|    | agttctaatt tttggcaaaa ctggagcagc taataaaact acattagaaa acgtgctcat   | 1440 |
|    | gacaaatgaa gaagaaatto gtootaccaa cooggtagot acogaggaat acgggattgt l | 1500 |
| 50 | aagcagcaac ttgcaggcgg ctagcaccgc agcccagaca caagttgtta acaaccaggg l | L560 |
|    | agecttacet ggcatggtet ggcagaaceg ggaegtgtae etgcaaggte ceatttggge l | 620  |
|    | caagatteet cacaeggaeg geaactttea ecegteteet etaatgggtg getttggaet 1 | 680  |
| 55 | gaaacacccg cctccccaga tcctgatcaa aaacacaccg gtacctgcta atcctccaga 1 | .740 |

| •  |                                                                   |        |
|----|-------------------------------------------------------------------|--------|
|    | agtgtttact cctgccaage ttgcttcctt catcacgcag tacagcaccg ggcaagtcag | 1800   |
|    | cgttgagatc gagtgggagc tgcagaaaga gaacagcaag cgctggaacc cagagattca | 18 60  |
| 5  | gtaçacetec aactttgaca aacagactgg agtggacttt getgttgaca gecagggtgt | 1920   |
| •  | ttactctgag cct                                                    | 1933   |
|    | · ·                                                               |        |
| 10 | <210> 53<br><211> 1933<br><212> DNA                               |        |
|    | <213> new AAV serotype, clone 223.7                               |        |
| 15 | <400> 53                                                          |        |
|    | caaggeetae gaccageage teaaageggg tgacaateeg tacetgeggt ataaccaege | 60     |
|    | cgacgccgag tttcaggagc gtcttcaaga agatacgtct tttgggggca acctcgggcg | 120    |
| 20 | agcagtette caggecaaaa agegggttet egaacetett ggtetggttg agaegeeage | 180    |
|    | taagacggca cctggaaaga agcgaccggt agactcgcca gactccacct cgggcatcgg | 240    |
|    | caagaaaggc cagcagcccg cgaaaaagag actcaacttt gggcagactg gcgactcaga | 300    |
| 25 | gtcagtcccc gaccctcaac caatcggaga accaccagca ggcccctctg gtctgggatc | 360    |
|    | tggtacaatg gctgcaggcg gtggcgcacc aatggctgac aataacgagg gcgccgacgg | 420    |
|    | agtgggtaat gcctcaggaa attggcattg cgattccaca tggctgggcg acagagtcat | 480    |
| 30 | caccaccage accegaacet gggccctgcc cacctacaac aaccacctct acaagcaaat | 54 O   |
|    | ctccagtcag tcagcaggga gcaccaacga taacgtctat ttcggctaca gcaccccctg | 600    |
|    | ggggtatttt gacttcaaca gattccattg ccacttctca ccacgtgact ggcagcgact | 660    |
| 35 | tatcaacaac aactggggat tooggcocaa gaagotcaac ttcaagotot toaacatoca | 720    |
|    | ggtcaaggag gtcacgacga atgacggcgt cacaaccatc gctaataacc ttaccagcac | 780    |
|    | ggttcaggtc ttttcggacc cggaatatca actgccgtac gtcctcggct ccgcgcacca | 840    |
| 40 | gggctgcctg cctccgttcc cggcagacgt gttcatgatt ccgcagtacg gatacctgac | 900    |
|    | totgaacaat ggcagocaat oggtaggoog trootcotto tactgootgg agtactttoo | 960    |
|    | ttctcagatg ctgagaacgg gcaacaactt cacctttagc tacaccttcg aggacgtgcc | 1020   |
| 45 | tttccacage agetacgege acagecagag tetggacegg etgatgaate ceetcatega | 1080   |
|    | ccagtacctg tactacttgg ccagaacaca gagcaacgca ggaggtactg ctggcaatcg | 1140   |
| •  | ggaactgcag ttttatcagg gcggacctac caccatggcc gaacaagcaa agaactggct | 1200   |
| 50 | gcccggacct tgcttccggc aacagagagt atccaagacg ctggatcaaa ataacaacag | 1260 . |
|    | caactttgcc tggactggtg ccacaaaata ccatttaaat ggaagaaatt cattggttaa | 1320   |
|    | tocoggtgto gocatggcaa cocacaagga cgacgaggaa cgottottoc ottogagogg | 1380   |
| EE |                                                                   |        |

agttctaatt tttggcaaaa ctggagcagc taataaaact acattagaaa acgtgctcat

gacaaatgaa gaagaaatto gtootaccaa cooggtagot accgaggaat acgggattgt

1440

1500

|          | aagcagcaac ttgcaggcgg ctagcaccgc agcccagaca caagttgtta acaaccaggg         | 1560 |
|----------|---------------------------------------------------------------------------|------|
|          | agcettacet ggcatggtet ggcagaaceg ggaegtgtae etgcaaggte ccatttggge         | 1620 |
| 5        | caagatteet cacaeggaeg geaactttea ecegteteet etaatgggtg getttggaet         | 1680 |
|          | gaaacacccg cotocccaga tootgatcaa aaacacaccg gtacctgota atootocaga         | 1740 |
|          | agtgtttact cctgccaaga ttgcttcctt catcacgcag tacagcaccg ggcaagtcag         | 1800 |
| 10       | cgttgagatc gagtgggagc tgcagaaaga gaacagcaag cgctggaacc cagagattca         | 1860 |
|          | gtacacctcc aactttgaca aacagactgg agtggacttt gctgttgaca gccagggtgt         | 1920 |
|          | ttactctgag cct                                                            | 1933 |
| 15<br>20 | <210> 54<br><211> 3123<br><212> DNA<br><213> new AAV serotype, clone A3.4 |      |
| 25       | <400> 54                                                                  |      |
|          | gaattegeee tttetaegge tgegteaact ggaccaatga aaacttteee tteaacgatt         | 60   |
| 25       | gcgtcgacaa gatggtgatc tggtgggagg agggaaagat gaccgccaag gtcgtggaat         | 120  |
|          | ctgccaaagc cattctgggt ggaagcaagg ttcgtgtgga ccagaaatgc aagtcttcgg         | 180  |
|          | cccagatoga cccgactoog gtgattgtca cctctaacac caacatgtgc gccgtgattg         | 240  |
| 30       | acggaaactc gaccaccttc gagcaccagc agccgttgca agaccggatg ttcaaatttg         | 300  |
|          | aacttacccg ccgtttggat catgactttg ggaaggtcac caagcaggaa gtcaaagact         | 360  |
|          | ttttccggtg ggctcaagat cacgtgactg aggtggagca tgagttctac gtcaaaaagg         | 420  |
| 35       | gtggagccaa gaaaaggccc gcccccgatg atgtatatat aaatgagccc aagcgggcgc         | 480  |
|          | gcgagtcagt tgcgcagcca tcgacgtcag acgcggaagc ttcgataaac tacgcgggca         | 540  |
| 40       | ggtaccaaaa caaatgttot ogtoacgtgg gcatgaatot gatgotgttt cootgtogac         | 600  |
| 40       | aatgcgaaag aatgaatcag aattcaaata totgottcac acacgggcaa aaagactgtt         | 660  |
|          | tggaatgott tocogtgtoa gaatotoaao cogtttotgt ogtoagaaaa acgtatoaga         | 720  |
|          | aactttgtta cattcatcat atcatgggaa aagaaccaga cgcctgcact gcctgcgacc         | 780  |
| 45       | tggtaaatgt ggacttggat gactgtattt ctgagcaata aatgacttaa atcaggtatg         | 840  |
|          | gctgctgacg gttatcttcc agattggctc gaggacactc tctctgaagg aatcagacag         | 900  |
| 50       | tggtggaage teaaacetgg eccaecaceg eegaaaceta accaacaaca eegggaegae         | 960  |
| 50       |                                                                           | 1020 |
|          |                                                                           | 1080 |
| 55       |                                                                           | 1140 |
| 55       |                                                                           | 1200 |
|          | aaaaagaggg tactcgagcc tcttggtctg gttgaggaag ctgttaagac ggctcctgga         | 1260 |

| aaaaagagac | ctatagagca   | gictcctgca | gaaccggact | : cttcctcgg  | g categgegaa | 132  |
|------------|--------------|------------|------------|--------------|--------------|------|
| tcaggccagc | agcccgctaa   | gaaaagacto | aattttggto | : agactggcga | a cacagagtca | 138  |
| gtcccagacc | ctcaaccaat   | cggagaaccc | cccgcagccc | cctctggtgt   | gggatctaat   | 144  |
| acaatggctt | caggcggtgg   | ggcaccaatg | gcagacgata | acgaaggcg    | cgacggagtg   | 150  |
| ggtaattcct | cgggaaattg   | gcattgcgat | tccacatgga | tgggcgacag   | agttatcacc   | 156  |
| accagcacaa | gaacctgggc   | cctcccacc  | tacaataatc | acctctacae   | gcasatctcc   | 162  |
| agcgaatcgg | gagccaccaa   | cgacaaccac | tacttcggct | acagcacccc   | ctgggggtat   | 168  |
| tttgacttta | acagattcca   | ctgtcacttc | tcaccacgtg | actggcagcg   | actcatcaac   | 174  |
| aacaactggg | gatttagacc   | caagaaactc | aatttcaagc | tcttcaacat   | ccaagtcaag   | 180  |
| gaggtcacgc | agaatgatgg   | aaccacgacc | atcgccaata | accttaccag   | cacggtgcag   | 186  |
| gtcttcacag | actetgagta   | ccagctgccc | tacgtcctcg | gttcggctca   | ccagggctgc   | 1920 |
| cttccgccgt | tcccagcaga   | cgtcttcatg | attcctcagt | acggctactt   | gactctgaac   | 1980 |
| aatggcagcc | aagcggtagg   | acgttcttca | ttctactgtc | tagagtattt   | tocctotoag   | 2040 |
| atgctgagga | cgggaaacaa   | cttcaccttc | agctacactt | ttgaagacgt   | gcctttccac   | 2100 |
| agcagctacg | cgcacagcca   | gagtctggat | cggctgatga | atcctctcat   | tgaccagtac   | 2160 |
| ctgtattacc | tgagcaaaac   | tcagggtaca | agtggaacaa | cgcagcaatc   | gagactgcag   | 2220 |
| ttcagccaag | ctgggcctag   | ctccatggct | cagcaggcca | aaaactggct   | accgggaccc   | 2280 |
| agctaccgac | agcagcgaat   | gtctaagacg | gctaatgaca | acaacaacag   | tgaatttgct   | 2340 |
| tggactgcag | ccaccaaata   | ttacctgaat | ggaagaaatt | ctctggtcaa   | tecegggeee   | 2400 |
| ccaatggcca | gtcacaagga   | cgatgaggaa | aagtatttcc | ccatgcacgg   | aaatctcatc   | 2460 |
| tttggaaaac | aaggcacagg   | aactaccaat | gtggacattg | aatcagtgct   | tattacagac   | 2520 |
| gaagaagaaa | tcagaacaac   | taatcctgtg | gctacagaac | aatacggaca   | ggttgccacc   | 2580 |
| aaccatcaga | gtcaggacac   | cacagettee | tatggaagtg | tggacagcca   | gggaatctta   | 2640 |
| cctggaatgg | tgtggcagga . | ccgcgatgtc | tatcttcaag | gtcccatttg   | ggccaaaact   | 2700 |
| cctcacacgg | acggacactt   | tcatccttct | ccgctcatgg | gaggetttgg   | actgaaacac   | 2760 |
| cctcctcccc | agatcctgat   | caaaaacaca | cctgtgccag | cgaatcccgc   | gaccactttc   | 2820 |
| actcctggaa | agtttgcttc   | gttcattacc | cagtattcca | ccggacaggt   | cagcgtggaa   | 2880 |
| atagagtggg | agctgcagaa   | agaaaacagc | aaacgctgga | acccagaaat   | tcagtacacc   | 2940 |
| tccaactaca | acaagtcggt   | gaatgtggag | tttaccgtgg | acgcaaacgg   | tgtttattct   | 3000 |
| gaaccccgcc | ctattggcac   | tcgttacctt | acceggaact | tgtaatttcc   | tgttaatgaa   | 3060 |
| taaaccgatt | tatgcgtttc   | agttgaactt | tggtctctgc | gaagggcgaa   | ttcgcggccg   | 3120 |
| cta        |              |            |            |              |              | 3123 |
|            |              |            |            |              |              |      |

<210> 55 <211> 3113

<212> DNA <213> new AAV serotype, clone A3.5

<400> 55

5

|    | gaattegese tttetaegge tgegteaact ggaccaatga aaacttteee tteaacgatt | 60    |
|----|-------------------------------------------------------------------|-------|
| ,  | gCgtcgacaa gatggtgatc tggtgggagg agggaaagat gaccgccaag gtcgtggaat | 120   |
| 10 | ctgccaaagc cattotgggt ggaagcaagg ttogtgtgga ccagaaatgc aagtottogg | 180   |
|    | cccagatcga cccgactccg gtgattgtca cctctaacac caacatgtgc gccgtgattg | 240   |
|    | acggaaactc gaccaccttc gagcaccagc agccgttgca agaccggatg ttcaaatttg | 300   |
| 15 | AACTTACCCG CCGTTTGGAT CATGACTTTG GGBAGGTCAC CAAGCAGGAA GTCAAAGACT | 360   |
|    | ttttccggtg ggctcaagat cacgtgactg aggtggagca tgagttctac gtcaaaaagg | 420   |
|    | gtggagccaa gaaaaggccc gcccccgatg atgtatatat aaatgagccc aagcgggcgc | 480   |
| 20 | gcgagtcagt tgcgcagcca tcgacgtcag acgcggaagc ttcgataaac tacgcggaca | 540   |
|    | ggtaccaaaa caaatgttot ogtoacgtgg gcatgaatot gatgotgttt cootgtogac | 600   |
|    | aatgcgaaag aatgaatcag aattcaaata totgottoac acacgggcaa aaagactgtt | 660   |
| 25 | tggaatgett teeegtgtea gaateteaae eegtteetgt egteagaaaa aegtateaga | 720   |
|    | aactttgtta cattcatcat atcatgggaa aagtaccaga cgcctgcact gcctgcgacc | 780   |
|    | tggtaaatgt ggacttggat gactgtattt ctgagcaata aatgacttaa atcaggtatg | 840   |
| 30 | gctgctgacg gttatcttcc agattggctc gaggacactc tctctgaagg aatcagacag | 900   |
|    | tggtggaagc tcaaacctgg cccaccaccg ccgaaaccta accaacaaca ccgggacgac | 960   |
|    | agtaggggtc ttgtgcttcc tgggtacaag tacctcggac ccttcaacgg actcgacaaa | 1020  |
| 35 | ggagagccgg tcaacgaggc agacgccgcg gccstcgagc acgacaaagc ctacgaccac | 1080  |
|    | cageteaage aaggggacaa ecegtacete aaatacaace aegeggaege tgaattteag | 1140  |
|    | gagegtette aagaagatae gtettteggg ggeaaceteg ggegageagt etteeaggee | 1200  |
| 40 | aaaaagaggg tactcgagcc tcttggtctg gttgaggaag ctgttaagac ggctcctgga | 1260  |
|    | anaaagagac ctatagagca gtctcctgca gaaccggact cttcctcggg catcggcaaa | 1320  |
|    | tcaggccagc agcccgctaa gaaaagactc aattttggtc agactggcga cacagagtca | 1380  |
| 45 | gtcccagacc ctcaaccaat cggagaaccc cccgcagccc cctctggtgt gggatctaat | 1440  |
|    | acaatggett caggeggtgg ggeaceaatg geagaeaata acgaaggege egaeggagtg | 1500  |
|    | ggtaatteet egggaaattg geattgegat tecacatgga tgggegacag agttateace | 1560  |
| 50 | accagcacaa gaacctgggc cctcccacc tacaataatc acctctacaa gcaaatctcc  | 1620  |
|    | agogaatogg gagocaccaa ogacaaccao tacttoggot acagoaccoo otgggggtat | 1680  |
|    | trigactita acagattica cigicactic teaccaegig actggeageg acteateaat | 174 Ö |

|           | aabaaccygg         | gairtagact | caayaaaccc   | . aacticaag | Cottcaaca    | . ccaagccaag | 180  |
|-----------|--------------------|------------|--------------|-------------|--------------|--------------|------|
| _         | gaggtcacgo         | agaatgatgg | aaccacgacc   | atcgccaata  | a accttaccaç | g cacggtgcag | 186  |
| 5         | gtcttcacag         | actetgagta | ccagetgese   | tacgtcctc   | g gttcggctca | ccagggctgc   | 1920 |
|           | cttccgccgt         | tcccagcaga | cgtcttcatg   | attcctcagt  | acggctactt   | gactctgaac   | 1986 |
| 10        | aatggcagcò         | aagcggtagg | , acattcttca | ttctactgtc  | : tagagtattt | teccteteag   | 2040 |
| 10        | atgctgagga         | cgggaaacaa | cttcaccttc   | agctacactt  | : ttgaagacgt | gcctttccac   | 2100 |
|           | agcagctacg         | cgcacagcca | gagtctggat   | cggctgatga  | atcctctcat   | tgaccagtac   | 2160 |
| 15        | ctgtattacc         | tgagcaaaac | tcagggtaca   | agtggaacaa  | cgcagcaatc   | gagactgcag   | 2220 |
|           | ttcaaccaag         | ctgggcctag | ctccatggct   | cagcaggcca  | aaaactggct   | accgggaccc   | 2280 |
|           | agctaccgac         | agcagcgaat | gtctaagacg   | gctaatgaca  | acaacaacag   | tgaatttgct   | 2340 |
| 20        | tggactgcag         | ccaccaaata | ttacccgaat   | ggaagaaatt  | ctctggtcaa   | tecegggeee   | 2400 |
|           | ccaatggcca         | gtcacaagga | cgatgaggaa   | aagtatttcc  | ccatgcacgg   | aaatctcatc   | 2460 |
|           | tttggaaaac         | aaggcacagg | aactaccaat   | gtggacattg  | aatcagtgct   | tattacagac   | 2520 |
| 25        | gaagaagaaa         | tcagaacgac | taatcctgtg   | gctacagaac  | aatacggaca   | ggttgccacc   | 2580 |
|           | aaccgtcaga         | gtcagaacac | cacagcttcc   | tatggaagtg  | tggacagcca   | gggaatctta   | 2640 |
|           | ········cctggaatgg | tgtggcagga | ccgcgatgtc   | tatcttcaag  | gtcccatttg   | ggccaaaact   | 2700 |
| 30        | cctcacacgg         | acggacactt | tcatccttct   | ccgctcatgg  | gaggctttgg   | actgaaacac   | 2760 |
|           | cctcctcccc         | agatoctgat | Caaaaacaca   | cctgtgccag  | cgaatcccgc   | gaccactttc   | 2820 |
|           | actcctggaa         | agtttgcttc | gttcattacc   | cagtattcca  | ccggacaggt   | cagcgtggaa   | 2880 |
| <i>35</i> | atagagtggg         | agctgcagaa | agaaaacagc   | aaacgctgga  | acccggaaat   | tcagtacacc   | 2940 |
|           | tccaactaca         | acaagtcggt | gaatgtggag   | tttaccgtgg  | acgcaaacgg   | tgtttattct   | 3000 |
|           |                    | ctattggcac |              |             |              |              | 3060 |
| 40        | taaaccgatt         | tatgcgtttc | agttgaactt   | tggtctctgc  | gaagggcgaa   | ttc          | 3113 |

<210> 56

<211> 3122

<212> DNA

45 <213> new AAV serotype, cione A3.7

<400> 56

50

|    | agcggccgcg | aattogcoot | ttctacggct | gcgtcaactg | gaccaatgaa | aactttccct   | 60  |
|----|------------|------------|------------|------------|------------|--------------|-----|
|    | tcaacgattg | cgtcgacaag | atggtgatct | ggtgggagga | gggaaagatg | accgccaagg   | 120 |
| 5  | tcgtggaatc | tgccaaagcc | attctgggtg | gaagcaaggt | tegtgtggac | cagaaatgca   | 180 |
|    | ggtcttcggc | ccagatcgac | ccgactccgg | tgattgtcac | ctctaacacc | aacatgtgcg   | 240 |
|    | ccgtgattga | cggaaactcg | accaccttcg | agcaccagca | gccgttgcaa | gaccggatgt ' | 300 |
| 10 | tcaaatttga | acttacccgc | cgtttggatc | atgactttgg | gaaggtcacc | aagcaggaag   | 360 |
|    |            |            |            |            |            |              |     |
|    |            |            |            |            |            |              |     |

| tcaaagactt | tttccggtgg | gctcaagato   | : acgtgactga | ggtggagcat | gagttctacg | 420  |
|------------|------------|--------------|--------------|------------|------------|------|
| tcaaaaaggg | tggagccaag | , aaaaggcccg | ccccgatga    | tgtatatata | aatgagccca | 480  |
| agcgggcgcg | cgagtcagtt | gcgcagccat   | : cgacgtcage | cgcggaagct | tcgataaact | 540  |
| acgcggacag | gtaccasaac | aaatgttctc   | gtcacgtggg   | catgaatctg | atgctgtttc | 600  |
| cctgtcgaca | atgcgaaaga | atgaatcaga   | attcaaatat   | ctgcttcaca | cacgggcaaa | 660  |
| aagactgttt | ggaatgcttt | cccgtgtcag   | aatctcaacc   | cgtttctgtc | gtcagaaaaa | 720  |
| cgtatcagaa | actttgttac | attcatcata   | tcatgggaaa   | agtaccagac | gcctgcactg | 780  |
| cctgcgacct | ggtaaatgtg | gacttggatg   | actgtatttc   | tgagcaataa | atgacttaaa | 840  |
| tcaggtatgg | ctgctgacgg | ttatcttcca   | gattggctcg   | aggacactct | ctctgaagga | 900  |
| atcagacagt | ggtggaagct | caaacctggc   | ccaccaccgc   | cgaaacctaa | ccaacaacac | 960  |
| cgggacgaca | gtaggggtct | tgtgcttcct   | gggtacaagt   | acctcggacc | cttcaacgga | 1020 |
| ctcgacaaag | gagagccggt | caacgaggca   | gacgccgcgg   | ccctcgagca | cgacaaagcc | 1080 |
| tacgaccacc | agctcaagca | aggggacaac   | ccgtacctca   | aatacaacca | cgcggacgct | 1140 |
| gaatttcagg | agcgtcttca | agaagatacg   | tctttcgggg   | gcaacctcgg | gcgagcagtc | 1200 |
| ttccaggcca | aaaagagggt | actcgagcct   | cttggtctgg   | ttgaggaagc | tgttaagacg | 1260 |
| gctcctggaa | aaaagagacc | tatagagcag   | tctcctgcag   | aaccggactc | ttcctcggge | 1320 |
| atcggcaaat | caggccagca | gcccgctaag   | aaaagactca   | attttggtca | gactggcgac | 1380 |
| acagagtcag | tcccagaccc | tcaaccaatc   | ggagaacccc   | ccgcagcccc | ctctggtgtg | 1440 |
| ggatctaata | caatggcttc | aggcggtggg   | gcaccaatgg   | cagacaataa | cgaaggcgcc | 1500 |
| gacggagtgg | gtaattcctc | gggaaattgg   | cattgcgatt   | ccacatggat | gggcgacaga | 1560 |
| gttatcacca | ccagcacaag | &acctgggcc   | ctccccacct   | acaataatcg | cctctacaag | 1620 |
| caaatctcca | gcgaatcggg | agccaccaac   | gacaaccact   | acttcggcta | cagcacccc  | 1680 |
| tgggggtatt | ttgactttaa | cagattccac   | tgtcacttct   | caccacgtga | ctggcagcga | 1740 |
| ctcatcaaca | acaactgggg | atttagaccc   | aagaaactca   | atttcaagct | cttcaacatc | 1800 |
| caagtcaagg | aggtcacgca | gaatgatgga   | accacgacca   | togocaataa | ccttaccagc | 1860 |
| acggtgcagg | tcttcacaga | ctctgagtac   | cagctgccct   | acgtectegg | ttcggctcac | 1920 |
| cagggctgcc | ttccgccgtt | cccagcagac   | gtcttcatga   | ttcctcagta | cggctacttg | 1980 |
| actctgaaca | atggcagcca | agcggtagga   | cgttcttcat   | tctactgtct | agagtatttt | 2040 |
| ccctctcaga | tgctgaggac | gggaaacaac   | ttcaccttca   | gctacacttt | tgaagacgtg | 2100 |
| cctttccaca | gcagctacgc | gcacagccag   | agtctggatc   | ggctgatgaa | toototoatt | 2160 |
| gaccagtacc | tgtattacct | gagcaaaact   | Cagggtacaa   | gtggaacaac | gcagcaatcg | 2220 |
| agactgcagt | tcagccaagc | tgggcctagc   | tccatggctc   | agcaggccaa | aaactggcta | 2280 |

| ccgggaccca  | gctaccgaca | gcagcgaatg | tctaagacgg | ctaatgacaa | caacaacagt   | 2340 |
|-------------|------------|------------|------------|------------|--------------|------|
| gaattigctt  | ggactgcagc | caccaaatat | tacctgaatg | gaagaaattc | tctggtcaat   | 2400 |
| cccgggcccc  | caatggccag | tcacaaggac | gatgaggaaa | agtatttccc | catgcacgga   | 2460 |
| aatotcatot  | ttggaaaaca | aggcacagga | actaccaatg | tggacattga | atcagtgctt . | 2520 |
| attacagacg  | aagaagaaat | cagaacaact | aatcctgtgg | ctacagaaca | atacggacag   | 2580 |
| gttgccacca  | accatcagag | tcagaacacc | acagetteet | atggaagtgt | ggacagccag   | 2640 |
| ggaatcttac  | ctggaatggt | gtggcaggac | cgcgatgtct | atcttcaagg | tcccatttgg   | 2700 |
| gccaaaactc  | ctcacacgga | cggacacttt | catccttctc | cgctcatggg | aggctttgga   | 2760 |
| ctgaaacacc  | ctcctccca  | gatectgate | aaaaacacac | ctgtgccagc | gaatcccgcg   | 2820 |
| accactttca  | ctcctggaaa | gtttgcttcg | ttcattaccc | agtattccac | cggacaggtc   | 2880 |
| agcgtggaaa  | tagagtggga | gctgcagaaa | gaaaacagca | aacgctggaa | cccagaaatt   | 2940 |
| cagtacacct  | ccaactacaa | caagtcggtg | aatgtggagt | ttaccgtgga | cgcaaacggt   | 3000 |
| gtttattctg. | aaccccgccc | tattggcact | cgttacctta | cccggaactt | gtaatttcct   | 3060 |
| gttaatgaat  | aaaccgattt | atgogtttca | gttgaacttt | ggtetetgeg | aagggcgaat   | 3120 |
| tc          |            |            |            |            |              | 3122 |

<210> 57 30 <211> 3123 <212> DNA <213> new AAV serotype, clone A3.3

<400> 57

|   | gaattcgccc | tttctacggc | tgcgtcaact | ggaccaatga | aaactttccc | ttcaacgatt  | 60          |
|---|------------|------------|------------|------------|------------|-------------|-------------|
|   | gcgtcgacaa | gatggtgatc | tggtgggagg | agggaaagat | gaccgccaag | gtcgtggaat  | 120         |
|   | ctgccaaagc | cattctgggt | ggaggcaagg | ttcgtgtgga | ccagaaatgc | aagtcttcgg  | 180         |
|   | cccagatcga | cccgactccg | gtgattgtca | cctctaacac | caacatgtgc | gccgtgattg  | 240         |
|   | acggaaactc | gaccaccttc | gagcaccagc | agccgttgca | agaccggatg | ttcaaatttg  | 300         |
|   | aacttacccg | ccgtttggat | catgactttg | ggaaggtcac | caagcaggaa | gtcasagact  | 360         |
|   | ttttccggtg | ggctcaagat | cacgtgactg | aggtggagca | tgagttctac | gtcaaaaagg  | 420         |
|   | gtggagccaa | gaaaaggccc | gcccccgatg | atgtatatat | aaatgagccc | aagcgggcgc  | 480         |
|   | gcgagtcagt | tgcgcagcca | tcgacgtcag | acgcggaagc | ttcgataaac | tacgcggaca  | 54 O        |
|   | ggtaccaaaa | caaatgttct | cgtcacgtgg | gcatgaatct | gatgctgttt | ccctgtcgac  | 60 <b>O</b> |
|   | aatgcgaaag | aatgaatcag | aattcaaata | totgcttcac | acacgggcaa | aaagactgtt. | 660         |
| • | tggaatgctt | tcccgtgtca | gaatctcaac | cogtttctgt | cgtcagaaaa | acgtatcaga  | 720         |
|   | aactttgtta | cattcatcat | atcatgggaa | aagtaccaga | cgcctgcact | gcctgcgacc  | 780         |
|   | tggtaaatgt | ggacttggat | gactgtattt | ctgagcaata | aatgacttaa | atcaggtatg  | 840         |

|    | gctgctgacg gti  | tatettee agattgget | c gaggacacto | tctctgaag  | g aatcagacag | 900   |
|----|-----------------|--------------------|--------------|------------|--------------|-------|
|    | tggtggaagc tca  | aaacctgg cccaccacc | g ccgaaaccta | accaacaaca | a ccgggacgac | 960   |
| 5  | agtaggggtc tto  | gtgcttcc tgggtacaa | g tacctcggac | ccttcaacg  | g actcgacaaa | 1020  |
|    | ggagagccgg tca  | acgagge agacgccgc  | g gccctcgagc | acgacaaago | ctacgaccac   | 10,80 |
|    | cageteaage aag  | gggacaa cccgtacct  | c aaatacaacc | acgcggacgo | tgaatttcag   | 1140  |
| 10 | gagcgtcttc aag  | aagatac gtctttcgg  | g ggcaacctcg | ggcgagcagt | cttccaggcc   | 1200  |
|    | aaaaagaggg tac  | togagee tettggtet  | g gttgaggaag | ctgttaagac | ggctcctgga   | 1260  |
| 15 | aaaaagagac cta  | tagagca gtctcctgc  | a gaaccggact | cttcctcggg | catcggcaaa   | 1320  |
| 73 | tcaggccagc agc  | ccgctaa gaaaagacto | aattttggtc   | agactggcga | cacagagtca   | 1380  |
|    | gtcccaggcc ctc  | aaccaat cggagaacc  | cccgcagccc   | cctctggtgt | gggatctaat   | 1440  |
| 20 | acaatggctt cag  | geggtgg ggcaccaatq | gcagacaata   | acgaaggege | cgacggagtg   | 1500  |
|    | ggtaatteet egg  | gaaattg gcattgcgat | tccacatgga   | tgggcgacag | agttatcacc   | 1560  |
|    | accagcacaa gaa  | cctgggc cctcccac   | tacaataatc   | acctctacaa | gcaaatctcc   | 1620  |
| 25 | agcgaatcgg gag  | ccaccaa cgacaaccac | tacttcggct   | acagcacccc | ctgggggtat   | 1680  |
|    | tttgacttta aca  | gattoca ctgtcactto | tcaccacgtg   | actggcagcg | actcatcaac   | 1740  |
|    | aacaactggg gat  | ttagacc caagaaactc | aatttcaagc   | tcttcaacat | ccaagtcaag   | 1800  |
| 30 |                 | atgatgg aaccacgacc |              |            |              | 1860  |
|    | •               | ctgagta ccagctgccc |              |            |              | 1920  |
|    | •               | cagcaga cgtcttcatg |              |            |              | 1980  |
| 35 |                 | eggtagg acgttettea |              |            |              | 2040  |
|    |                 | gaaacaa cttcaccttc |              |            |              | 2100  |
|    |                 | acageca gagtetggat |              |            |              | 2160  |
| 40 |                 | rcaaaac tcagggtaca |              |            |              | 2220  |
|    |                 | gcctag ctccatggct  |              |            |              | 2280  |
|    |                 | gcgaat gtctaagacg  |              |            |              | 2340  |
| 45 |                 | caaata ttacctgaat  |              |            |              | 2400  |
|    | •               | caagga cgatgaggaa  |              |            |              | 2460  |
|    | tttggaaaac aagg | cacagg aactaccaat  | gtggacattg a | aatcagtgct | tattacagac   | 2520  |
| 50 | gaagaagaaa tcag | aacaac taatcctgtg  | gctacagaac a | atacggaca  | ggttgccacc   | 2580  |
|    | aaccatcaga gtca | gaacac cacagettee  | tatggaagtg t | eggacageca | gggaatctta   | 2640  |
|    | cctggaatgg tgtg | gcagga ccgcgatgtc  | tatcttcaag o | stcccatttg | ggccaaaact   | 2700  |
| 55 | cctcacacgg acgg | acactt tcatcettet  | ccgctcatgg g | gaggctttgg | actgaaacac   | 2760  |
|    |                 |                    |              |            |              |       |

|    | cctcctcccc ag      | gatoctgat      | caaaacaca  | cctgtgccag | cgaatcccgc | gaccactttc | 2820 |
|----|--------------------|----------------|------------|------------|------------|------------|------|
|    | actcctggaa ag      | gtttgcttc      | gttcattacc | cagtattcca | cctgacaggt | cagcgtggaa | 2880 |
| 5  | atagagtggg ag      | gctgcagaa      | agaaaacagc | aaacgctgga | acccagaaat | tcagtacacc | 2940 |
|    | tccaactaca ac      | aagtcggt       | gaatgtggag | tttaccgtgg | acgcaaacgg | tgtttattct | 3000 |
|    | gaacecegee et      | attggcac       | tegttacett | acccggaact | tgtaatttcc | tgttaatgaa | 3060 |
| 10 | taagccgatt ta      | tgcgtttc       | agttgaactt | tggtctctgc | gaagggcgaa | ttcgtttaaa | 3120 |
|    | cct                |                |            |            |            |            | 3123 |
|    |                    |                |            |            |            |            |      |
| 15 | <210> 58           |                |            |            |            |            |      |
|    | <211> 2969         |                |            |            |            |            |      |
|    | <212> DNA          |                |            |            |            |            |      |
|    | <213> new AAV sero | otype, clone 4 | 2.12       |            |            |            |      |
| 20 | <400> 58           |                |            |            |            |            |      |
|    |                    | •              |            |            |            |            |      |
|    |                    |                |            |            |            |            |      |
|    |                    |                |            |            |            |            |      |
| 25 |                    |                |            |            |            |            |      |
| 23 |                    |                |            |            |            |            |      |
|    |                    |                |            |            |            |            |      |

|    | gaattcgccc  | tttctacggc | tgcgtcaact | ggaccaatga | gaactttccc | ttcaacgatt | 60   |
|----|-------------|------------|------------|------------|------------|------------|------|
|    | gcgtcgacaa  | gatggtgatc | tggtgggagg | agggcaagat | gacggccaag | gtcgtggagt | 120  |
| 5  | ccgccaaggc  | cattctcggc | ggcagcaagg | tgcgcgtgga | ccaaaagtgc | aagtcgtccg | 180  |
|    | cccagatcga  | CCCCACCCC  | gtgatcgtca | cctccaacac | caacatgtgc | gccgtgattg | 240  |
|    | acgggaacag  | caccaccttc | gagcaccagc | agccgttaca | agaccggatg | ttcaaatttg | 300  |
| 10 | aactcacccg  | ccgtctggag | cacgactttg | gcaaggtgac | aaagcaggaa | gtcaaagagt | 360  |
|    | tetteegetg  | ggcgcaggat | cacgtgaccg | aggtggcgca | tgagttctac | gtcagaaagg | 420  |
|    | gtggagccaa  | caagagaccc | gcccccgatg | acgcggataa | aagcgagccc | aagcgggcct | 480  |
| 15 | gcccctcagt  | cgcggatcca | tcgacgtcag | acgcggaagg | agctccggtg | gactttgccg | 540  |
|    | acaggtacca  | aaacaaatgt | tctcgtcacg | cgggcatgct | tcagatgctg | tttccctgca | 600  |
|    | agacatgcga  | gagaatgaat | cagaatttca | acatttgctt | cacgcacggg | accagagact | 660  |
| 20 | gttcagaatg  | tttccccggc | gtgtcagaat | ctcaaccggt | cgtcagaaag | aggacgtatc | 720  |
|    | ggaaactctg  | tgccattcat | catctgctgg | ggcgggctcc | cgagattgct | tgctcggcct | 780  |
|    | gcgatctggt  | caacgtggac | ctggatgact | gtgtttctga | gcaataaatg | acttaaacca | 840  |
| 25 | ggtatggctg  | ccgatggtta | tcttccagat | tggctcgagg | acaacctctc | tgagggcatc | 900  |
|    | cgcgagtggt. | gggacttgaa | acctggagcc | ccgaaaccca | aagccaacca | gcaaaagcag | 960  |
|    | gacgacggcc  | ggggtctggt | gcttcctggc | tacaagtacc | teggaccett | caacggactc | 1020 |
| 30 | gacaagggag  | agccggtcaa | cgaggcagac | gccgcggccc | tcgagcacga | caaggcctac | 1080 |
|    | gacaagcagc  | tcgagcaggg | ggacaacccg | tacctcaagt | acaaccacgc | cgacgccgag | 1140 |
|    | tttcaggagc  | gtcttcaaga | agatacgtct | tttgggggca | acctcgggcg | agcagtcttc | 1200 |
| 35 | caggccaaga  | agcgggttct | cgaacctctc | ggtctggttg | aggaaggcgc | taagacggct | 1260 |
|    | cctggaaaga  | agagaccggt | agagccatca | ccccagcgtt | ctccagactc | ctctacgggc | 1320 |

|     | atcggcaaga                                                | caggccagca       | gcccgcgaa  | a aagagactc | a actttgggc         | a gactggcgac | 1380 |
|-----|-----------------------------------------------------------|------------------|------------|-------------|---------------------|--------------|------|
| _   | tcagagtcag                                                | tgcccgaccc       | tcaaccaat  | ggagaaccc   | c ccgcaggcc         | c ctctggtctg | 1440 |
| 5   | ggatctggta                                                | caatggctgc       | aggcggtgg  | gctccaatg   | g cagacaata         | a cgaaggcgcc | 1500 |
|     | gacggagtgg                                                | gtagttcctc       | aggaaattg  | g cattgcgat | t ccacatggc         | t gggcgacaga | 1560 |
| 40  | gtcatcacca                                                | ccagcacccg       | aacctgggc  | ctecccaec   | t acaacaacca        | a cctctacaag | 1620 |
| 10  | caaatctcca                                                | acgggacatc       | gggaggaag  | accaacgac   | a acacctactt        | cggctacagc   | 1680 |
|     | acccctggg                                                 | ggtattttga       | ctttaacaga | ttccactgcc  | acttctcacc          | acgtgactgg   | 1740 |
| 4.5 | cagcgactca                                                | tcaacaacaa       | ctggggattc | cggcccaaga  | a gactcaactt        | : caagctcttc | 1800 |
| 15  | aacatccagg                                                | tcaaggaggt       | cacgcagaat | gaaggcacca  | agaccat <b>c</b> gc | caataacctt   | 1860 |
|     |                                                           |                  | *          |             |                     | cctcggctct   | 1920 |
| 00  | gcgcaccagg                                                | gctgcctgcc       | teegtteeeg | gcggacgtct  | tcatgattcc          | tcagtacggg   | 1980 |
| 20  |                                                           |                  |            |             |                     | ctgcctggag   | 2040 |
|     | ,                                                         |                  |            |             |                     | ccagtttgag   | 2100 |
|     | gacgtgcctt                                                |                  |            |             |                     |              | 2160 |
| 25  | ctcatcgacc                                                |                  |            |             |                     |              | 2220 |
|     | gggctgcagt                                                |                  |            |             |                     |              | 2280 |
| 20  | cccggaccct                                                |                  |            |             |                     |              | 2340 |
| 30  | aactttgcct                                                |                  |            |             |                     |              | 2400 |
|     | ccgggcgtag                                                | ccatggccac       | caacaaggac | gacgaggacc  | agttctttcc          | catcaacgga   | 2460 |
| 35  | gtgctggttt :                                              |                  |            |             |                     |              | 2520 |
| 35  | accagcgagg a                                              | aggagatcaa       | aaccaccaat | cccgtggcta  | cagaagaata          | cggtgtggtc   | 2580 |
| •   | tecageaace 1                                              |                  |            |             |                     |              | 2640 |
| 40  | gctctgcccg (                                              | gcatggtctg (     | Jcagaaccgg | gacgtgtacc  | tgcagggtcc          | catctgggcc   | 2700 |
| 40  | aaaattcctc a                                              | acacggacgg (     | aactttcac  | ccgtctcccc  | tgatgggcgg          | atttggactc   | 2760 |
|     | aaacacccgc c                                              | ctcctcaaat t     | ctcatcaag  | tatacttcca  | actactacaa          | atctacaaat   | 2820 |
| 45  | gtggactttg c                                              | tgtcaatac t      | gagggtact  | tattcagagc  | ctcgccccat          | tggcacccgt   | 2880 |
| 45  | tacctcaccc g                                              | rtaacctgta a     | ttgcctgtt  | aatcaataaa  | ccggttaatt          | cgtttcagtt   | 2940 |
|     | gaactttggt c                                              | tctgcgaag g      | gcgaattc   |             |                     |              | 2969 |
| 50  | <210> 59<br><211> 3129<br><212> DNA<br><213> new AAV seri | otype, clone 44. | 2          |             |                     |              |      |
|     |                                                           |                  |            |             |                     |              |      |

55

<400> 59

|   | gaattcgccc | tttctacggc | tgcgtcaact | ggaccaatga | gaactttccc | ttcaacgatt | 60 |
|---|------------|------------|------------|------------|------------|------------|----|
|   |            |            | •          |            |            |            |    |
| e |            |            |            |            |            |            |    |

|           | gcgtcgacaa   | gatggtgatc  | tggtgggagg  | agggcaagat | gacggccaag   | gtcgtggagt | 120          |
|-----------|--------------|-------------|-------------|------------|--------------|------------|--------------|
|           | ccgccaaggc   | cattctcggc  | ggcagcaaag  | tgcgcgtgga | a ccaaaagtgo | aagtcgtccg | 180          |
| 5         | cccagatcga   | cccacccc    | gtgatcgtca  | cctccaacac | : caacatgtgc | gccgtgattg | 240          |
|           | acgggaacag   | caccaccttc  | gagcaccagc  | agccgttgca | ggaccggatg   | ttcaagtttg | 300          |
|           | aactcacccg   | ccgtctggag  | cacgactttg  | gcaaggtgac | : aaagcaggaa | gtcagagagt | <b>,</b> 360 |
| 10        | tcttccgctg   | ggcgcaggat  | cacgtgaccg  | aggtggcgca | cgagttctac   | gtcagaaagg | 420          |
|           | gtggagccaa   | caagagaccc  | gcccccgatg  | acgcggataa | aagcgagccc   | aagcgggcct | 480          |
| 4.5       | gcccctcagt   | cacaderccé  | tcgacgtcag  | acgcggaagg | agctccggtg   | gactttgccg | 540          |
| 15        | acaggtacca   | asacaaatgt  | tctcgtcacg  | cgggcatgct | tcagatgctg   | tttccctgca | 600          |
|           | aaacatgcga   | gagaatgaat  | cagaatttca  | acatttgctt | cacgcacggg   | accagagact | 660          |
| 20        | gttcagaatg   | tttccccggc  | gtgtcagaat  | ctcaaccggt | cgtcagaaaa   | aagacgtatc | 720          |
| 20        | ggaaactctg   | tgcgattcat  | catctgctgg  | gggcgggcac | ccgagattgc   | ttgctcggcc | 780          |
|           | tgcgatctgg 1 | tcaacgtgga  | cctagatgac  | tgtgtttctg | agcaataaat   | gacttaaacc | 840          |
| 25        | aggtatggct ( | gccgatggtt  | atcttccaga  | ttggctcgag | gacaacctct   | ctgagggcat | 900          |
|           | tcgcgagtgg 1 | tgggacttga  | aacctggagc  | cccgaaaccc | aaagccaacc   | agcaaaagca | 960          |
|           | ggacgacggc   | eggggtetgg  | tgcttcctgg  | ctacaagtac | ctcggaccct   | tcaacggact | 1020         |
| 30        | cdøcvøååååå  | gagcccgtca  | acgcggcgga  | cgcagcggcc | ctcgagcacg   | acaaggceta | 1080         |
|           | cgaccagcag c | tcaaagcgg   | gtgacaatcc  | gtacctgcgg | tataaccacg   | ccgacgccga | 1140         |
|           | gtttcaggag c | gtctgcaag   | aagatacgtc  | ttttgggggc | aacctcgggc   | gagcagtctt | 1200         |
| <i>35</i> | ccaggccaag a | agcgggttc   | tcgaacctct  | cggtctggtt | gaggaaggcg   | ctaagacggc | 1260         |
|           | tcctggaaag a | agagaccgg   | tagagccatc  | accccagcgt | tctccagact   | cctctacggg | 1320         |
|           | catcggcaag a | aaggccagc   | agcccgcgaa  | aaagagactc | aactttgggc   | agactggcga | 1380         |
| 40        | ctcagagtca g | rtgcccgacc  | ctcaaccaat  | cggagaaccc | cccgcaggcc   | cctctggtct | 1440         |
|           | gggatctggt a | caatggctg   | caggcggtgg  | cgctccaatg | gcagacaata   | acgaaggcgc | 1500         |
|           | cgacggagtg g | gtagttcct   | caggaaattg  | gcattgcgat | tccacatggc   | tgggcgacag | 1560         |
| 45        | agtcatcacc a | ccagcaccc   | gaacstgggc  | cctccccacc | tacaacaacc   | acctctacaa | 1620         |
|           | gcaaatctcc a | acgggactt ( | -gggaggaag  | caccaacgac | aacacctact   | tcggctacag | 1680         |
|           | cacccctgg g  | ggtattttg   | actttaacag  | attocactgo | cacttctcac   | cacgtgactg | 1740         |
| 50        | gcagcgactc a | tcaacaaca a | actggggatt  | ccggcccaag | agactcaact   | tcaagctctt | 1800         |
|           | caacatccag g | tcaaggagg 1 | cacgcagaa   | tgaaggcacc | aagaccatcg   | ccaataacct | 1860         |
| •         | taccagcacg a | ttcaggtct 1 | tacggactc ( | ggaataccag | ctcccgtacg   | testeggete | 1920         |
| 55        | tgcgcaccag g | gctgcctgc d | teegtteee   | ggcggacgtc | ttcatgattc   | ctcagtacgg | 1980         |
|           |              |             |             |            |              |            |              |

|    | gtaccigaci | cegaacaacg | gcagccaggc | eg egggeege |            | actgeetgga  | 2040 |
|----|------------|------------|------------|-------------|------------|-------------|------|
|    | gtactttcct | totcaaatgo | tgagaacggg | caacaacttt  | gagttcagct | accagtttga  | 2100 |
| 5  | ggacgtgcct | tttcacagca | gctacgcgca | cagccaaagc  | ctggaccggc | tgatgaaccc  | 2160 |
|    | cctcatcgac | cagtacctgt | actacctgtc | tcggactcag  | tccacgggag | gtaccgcagg  | 2220 |
|    | aactcagcag | ttgctatttt | ctcaggccgg | gcctaataac  | atgtcggctc | aggccaaaaa  | 2280 |
| 10 | ctggctaccc | gggccctgct | accggcagca | acgcgtctcc  | acgacactgt | cgcaaaataa  | 2340 |
|    | caacagcaac | tttgcctgga | ccggtgccac | caagtatcat  | ctgaatggca | gagactctct  | 2400 |
| 45 | ggtaaatccc | ggtgtcgcta | tggcaaccca | caaggacgac  | gaagagegat | tttttccgtc  | 2460 |
| 15 | cagcggagtc | ttaatgtttg | ggaaacaggg | agctggaaaa  | gacaacgtgg | actatagcag  | 2520 |
|    | cgttatgcta | accagtgagg | aagaaattaa | aaccaccaac  | ccagtggcca | cagaacagta. | 2580 |
| 20 | cggcgtggtg | gccgataacc | tgcaacagca | aaacgccgct  | cctattgtag | gggccgtcaa  | 2640 |
| 20 | cagtcaagga | gccttacctg | gcatggtctg | gcagaaccgg  | gacgtgtacc | tgcagggtcc  | 2700 |
|    | tatctgggcc | aagattcctc | acacggacgg | aaactttcat  | ccctcgccgc | tgatgggagg  | 2760 |
| 25 | ctttggactg | aaacacccgc | ctcctcagat | cctgattaag  | aatacacctg | ttcccgcgga  | 2820 |
|    | tcctccaact | accttcagtc | aagctaagct | ggcgtcgttc  | atcacgcagt | acagcaccgg  | 2880 |
|    | acaggtcagc | gtggaaattg | aatgggagct | gcagaaagaa  | aacagcaaac | gctggaaccc  | 2940 |
| 30 | agagattcaa | tacacttcca | actactacaa | atctacaaat  | gtggactttg | ctgttaacac  | 3000 |
|    | agatggcact | tattctgagc | ctcgccccat | cggcacccgt  | tacctcaccc | gtaatctgta  | 3060 |
|    | attgcttgtt | aatcaataaa | ccggttgatt | cgtttcagtt  | gaactttggt | ctctgcgaag  | 3120 |
| 35 | ggcgaattc  |            |            |             |            |             | 3129 |

<210> 60 <211> 733

<212> PRT

<213> capsid protein of AAV serotype, clone C1VP1

<400> 60

**5**5

50

40

|    | Met<br>1 | Ala       | Ala       | qeA       | Gly<br>5 | Tyr | Leu       | Pro       | qeA       | Trp<br>10 | Leu | Glu       | qeA       | Asn       | Leu<br>15 | Ser |  |
|----|----------|-----------|-----------|-----------|----------|-----|-----------|-----------|-----------|-----------|-----|-----------|-----------|-----------|-----------|-----|--|
| 5  | Glu      | Gly       | Ile       | Arg<br>20 | Glu      | Trp | Trp       | Asp       | Leu<br>25 | Lys       | Pro | Gly       | Ala       | Pro<br>30 | Lys       | Pro |  |
| 10 | Lys      | Ala       | Asn<br>35 | Gln       | Gln      | Lys | Gln       | Asp<br>40 | Дзр       | Gly       | Arg | Gly       | Leu<br>45 | Val       | Leu       | Pro |  |
| 45 | Gly      | Tyr<br>50 | Lys       | Tyr       | Leu      | Gly | Pro<br>55 | Phe       | Asn       | Gly       | Leu | Asp<br>60 | Lys       | БĴУ       | Glu       | Pro |  |
| 15 |          |           |           |           |          |     |           |           |           |           |     |           |           |           |           |     |  |
| 20 |          |           |           |           |          |     |           |           |           |           |     |           |           |           |           |     |  |
| 25 |          |           |           |           |          |     |           |           |           |           | •   |           |           |           |           |     |  |
|    |          |           |           |           |          |     |           |           |           |           |     |           |           |           |           |     |  |

a jeden

| 5  | 65         | . Au       |            |            |            | 70         | u 71       | a Ale      | a ne         | . G.I.     | 75         | , As       | р шу         | 3 AL         | а 1у.       | 80<br>80   |
|----|------------|------------|------------|------------|------------|------------|------------|------------|--------------|------------|------------|------------|--------------|--------------|-------------|------------|
| J  | Glr        | . Gli      | ı Lei      | ı Lys      | 85         | a Gl       | y Ası      | eA c       | a Pro        | 90         | r Lei      | ı Ar       | g Ty         | r Ası        | n Hi:<br>95 | 3 Ala      |
| 10 | Asp        | Ala        | . Glu      | Phe<br>100 | e Glr      | n Glu      | ı Arç      | J Lei      | 1 Glr<br>105 |            | ı Asp      | Thi        | r Se:        | r Phe<br>110 |             | / Gly      |
| 15 | Asn        | Leu        | Gly<br>115 | Arg        | Ala        | val        | . Phe      | Glr<br>120 |              | Lys        | Lys        | Arg        | y Val<br>125 |              | ı Glu       | Pro        |
|    | Leu        | Gly<br>130 | Leu        | . Val      | Glu        | ı Glu      | 135        |            | . Lys        | Thr        | Ala        | Pro<br>140 |              | , Lys        | Lys         | Arg        |
| 20 | Pro<br>145 | Leu        | Glu        | Ser        | Pro        | Gln<br>150 |            | Pro        | Asp          | Ser        | Ser<br>155 |            | : Gly        | Ile          | Gly         | Lys<br>160 |
| 25 | Lys        | Gly        | Lys        | Gln        | Pro<br>165 |            | Lys        | Lys        | Arg          | Leu<br>170 | Asn        | Phe        | Glu          | Glu          | Asp<br>175  | Thr        |
| 20 | Gly        | Ala        | Gly        | Asp<br>180 | Gly        | Pro        | Pro        | Glu        | Gly<br>185   | Ser        | qeA        | Thr        | Ser          | Ala<br>190   |             | Ser        |
| 30 | Ser        | qeA        | Ile<br>195 | Glu        | Met        | Arg        | Ala        | Ala<br>200 | Pro          | Gly        | ely        | Asn        | Ala<br>205   |              | qeA         | Ala        |
| 35 | Gly        | Gln<br>210 | Gly        | Ser        | qeA        | Gly        | Val<br>215 | Gly        | Asn          | Ala        | Ser        | Gly<br>220 | Asp          | Trp          | His         | Суз        |
|    | Asp<br>225 | Ser        | Thr        | Trp        | Ser        | Glu<br>230 | Gly        | Lys        | Val          | Thr        | Thr<br>235 | Thr        | Ser          | Thr          | Arg         | Thr<br>240 |
| 40 | Trp        | Val        | Leu        | Pro        | Thr<br>245 | Tyr        | Asn        | Asn        | His          | Leu<br>250 | Tyr        | Leu        | Arg          | Leu          | Gly<br>255  | Thr        |
| 45 | Thr        | Ser        | Asn        | Ser<br>260 | Asn        | Thr        | Tyr        | Asn        | Gly<br>265   | Phe        | Ser        | Thr        | Pro          | Trp<br>270   | Gly         | Tyr        |
|    | Phe        | Asp        | Phe<br>275 | Asn        | Arg        | Phe        | His        | Cys<br>280 | His          | Phe        | Ser        | Pro        | Arg<br>285   | Asp          | Trp         | Gln        |
| 50 | Arg        | Leu<br>290 | Ile        | Asn        | Asn        | Asn        | Trp<br>295 | Gly        | Leu          | Arg        |            | Lys<br>300 | Ala          | Met          | Arg         | Val        |
| 55 | Lys<br>305 | Ile        | Phe        | Asn        | Ile        | Gln<br>310 | Val        | Lya        | Glu          | Val        | Thr<br>315 | Thr        | Ser          | neA          | Gly         | Glu<br>320 |

| 5         |   | Th         | r Thi      | r Val      | Ala        | 325 |            | ı Lev      | Thi               | s Sez      | 330 |            | . Glr      | Ile        | Phe        | 335 | Asp        |
|-----------|---|------------|------------|------------|------------|-----|------------|------------|-------------------|------------|-----|------------|------------|------------|------------|-----|------------|
|           |   | Sei        | Ser        | Tyr        | 340        |     | Pro        | туг        | va]               | 345        |     | Ala        | Gly        | Gln        | Glu<br>350 |     | Ser        |
| 10        |   | Let        | ı Ser      | 355        |            | Pro | Asn        | Asp        | <b>Val</b><br>360 |            | Met | Val        | . Pro      | Gln<br>365 |            | Gly | Tyr        |
| 15        |   | Cys        | 370        |            | Val        | Thr | Gly        | Glu<br>375 |                   | Gln        | Asn | Gln        | Thr<br>380 |            | Arg        | Asn | Ala        |
|           |   | 385        | i          |            |            |     | 390        |            |                   |            |     | 395        |            |            |            |     | Asn<br>400 |
| 20        |   |            |            |            |            | 405 |            | aeA        |                   |            | 410 |            |            |            |            | 415 |            |
| <i>25</i> |   |            |            |            | 420        |     |            | Pro        |                   | 425        |     | ÷          |            |            | 430        |     | -          |
| 30        | ٠ |            |            | 435        |            |     |            | Gln        | 440               |            |     |            |            | 445        |            |     |            |
|           |   |            | 450        |            |            |     |            | 455<br>Trp |                   |            |     |            | 460        |            |            | -   |            |
| 35        |   | 465        |            |            |            |     | 470        | Ser        |                   |            |     | 475        |            |            |            |     | 480        |
| 40        |   |            |            |            | Leu        | 485 |            | Tyr        |                   |            | 490 |            |            |            |            | 495 | -          |
|           |   | Trp        | Ser        | Asn        | 500<br>Ile | Ala | Pro        | Gly        |                   | 505<br>Pro | Met | Ala        | Thr        |            | 510<br>Gly | Pro | Ser        |
| 45        |   | Asp        |            | 515<br>Asp | Phe        | Ser | neA        | Ala        | 520<br>Gln        | Leu        | Ile | Phe        |            | 525<br>Gly | Pro        | Ser | Val        |
| 50        |   |            | 530<br>Gly | Asn        | Thr        | Thr |            | 535<br>Ser | Ala               | Asn        | Asn |            | 540<br>Leu | Phe        | Thr        |     |            |
|           |   | 545<br>Glu | Glu        | Ile        | Ala        |     | 550<br>Thr | Asn        | Pro               | Arg        |     | 555<br>Thr | Asp        | Met        |            | Gly | 560<br>Gln |
| 55        |   |            |            |            |            | 565 |            |            |                   |            | 570 |            |            |            |            | 575 |            |

| 5    |                                    | Ιlε        | Ala        | Asp        | Asn<br>580 |            | Glr        | Asn        | Ala        | Thr<br>585 |            | : Ala      | Pro        | Ile        | Thr<br>590 |            | ' Asn             |
|------|------------------------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|-------------------|
| J    |                                    | Val        | Thr        | Ala<br>595 | Met        | Gly        | Val        | Leu        | Pro<br>600 |            | Met        | Val        | Trp        | Gln<br>605 |            | Arg        | Asp               |
| 10   |                                    | Ile        | Tyr<br>610 | Tyr        | Gln        | Gly        | Pro        | Ile<br>615 | Trp        | Ala        | Lys        | Ile        | Pro<br>620 | His        | Ala        | Ąsp        | Gly               |
| 15   | •                                  | His<br>625 | Phe        | His        | Pro        | Ser        | Pro<br>630 | Leu        | Ile        | Gly        | Gly        | Phe<br>635 | Gly        | Leu        | Lys        | His        | Pro<br>640        |
|      |                                    | Pro        | Pro        | Gln        | Ile        | Phe<br>645 | Ile        | Lys        | neA        | Thr        | Pro<br>650 | Val        | Pro        | Ala        | Asn        | Pro<br>655 | Ala               |
| 20   |                                    | Thr        | Thr        | Phe        | Thr<br>660 | Ala        | Ala        | Arg        | Val        | Asp<br>665 | Ser        | Phe        | Ile        | Thr        | Gln<br>670 | Tyr        | Ser               |
| 25   |                                    | Thr        | Gly        | Gln<br>675 | Val        | Ala        | Val        | Gln        | Ile<br>680 | Glu        | Trp        | Glu        | Ile        | Glu<br>685 | Lys ·      | Glu        | Arg               |
|      | ·                                  | Ser        | 690<br>Lys | Arg        | Trp        | Asn        | Pro        | Glu<br>695 | Val        | Gln        | Phe        | Thr        | Ser<br>700 | Asn        | Tyr        | Gly        | Asn               |
| 30 . |                                    | Gln<br>705 | Ser        | Ser        | Met        | Leu        | Trp<br>710 | Ala        | Přo'       | Asp        | Thr        | Thr<br>715 | Gly        | Lys        | Tyr        | Thr        | <b>Glu</b><br>720 |
| 35   |                                    | Pro        | Arg        | Val        | Ile        | Gly<br>725 | Ser        | Arg        | Tyr        | Leu        | Thr<br>730 | Asn        | His        | Leu        |            |            |                   |
| ٠    | <210> 61<br><211> 733<br><212> PRT |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |                   |
| 40   | <213> caps                         | id prot    | tein of    | AAV s      | seroty     | pe, cic    | ne C       | 2VP1       |            |            |            |            |            |            |            |            |                   |
|      | <400> 61                           |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |                   |

|           | EP 1 310 571 B1 |           |           |           |           |          |           |           |           |           |           |           |           |           |           |           |           |
|-----------|-----------------|-----------|-----------|-----------|-----------|----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
|           |                 | Met<br>1  | Ala       | Ala       | Asp       | Gly<br>5 | Tyr       | Leu       | Pro       | Asp       | Trp<br>10 | Leu       | Glu       | qeA       | Asn       | Leu<br>15 | Ser       |
| 5         |                 | Glu       | Gly       | Ile       | Arg<br>20 | Glu      | Trp       | Trp       | qeA       | Leu<br>25 | Lys       | Pro       | Gly       |           | Pro<br>30 | Lys       | Leu       |
| 10        |                 | Lys       | Ala       | Asn<br>35 | Gln       | Gln      | Lys       | Gln       | Asp<br>40 | Asp       | Gly       | Arg       | Gly       | Leu<br>45 | Val       | Leu       | Pro       |
|           |                 | Gly       | Tyr<br>50 | Lys       | Tyr       | Leu      | Gly       | Pro<br>55 | Phe       | His       | Gly       | Leu       | Asp<br>60 | Lys       | Gly       | Glu       | Pro       |
| 15        |                 | Val<br>65 | Asn       | Ala       | Ala       | Asp      | Ala<br>70 | Ala       | Ala       | Leu       | Glu       | His<br>75 | qeA       | Lys       | Ala       | Tyr       | Asp<br>80 |
| <b>20</b> |                 |           |           |           |           |          |           |           |           |           |           |           |           |           |           |           |           |
| 25        |                 |           |           |           |           |          |           |           |           |           |           |           |           |           |           |           |           |

|     |   | Gln        | Gln        | Leu        | ГÀЗ        | Ala<br>85  | Gly        | qeA                | neA        | Pro        | Tyr<br>90  | Leu        | Arg        | Tyr        | Asn        | His<br>95  | Ala        |
|-----|---|------------|------------|------------|------------|------------|------------|--------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| . 5 |   | qeA        | Ala        | Glu        | Phe<br>100 | Gln        | Glu        | Arg                | Leu        | Gln<br>105 | Glu        | Ąsp        | Thr        | Ser        | Phe<br>110 | Gly        | Gly        |
| 10  |   | Asn        | `Leu       | Gly<br>115 | Arg        | Ala        | Val        | Phe                | Gln<br>120 | Ala        | Lys        | Lys        | Arg        | Val<br>125 | Leu        | Glu        | Pro        |
| ,   |   | Leu        | Gly<br>130 | Leu        | Val        | Glu        | Glu        | Gly<br>135         | Ala        | Lys        | Thr        | Ala        | Pro<br>140 | еĵу        | Lys        | Lys        | Arg        |
| 15  | • | Pro<br>145 | Leu        | Glu        | Ser        | Pro        | Gln<br>150 | Glu                | Pro        | Asp        | Ser        | Ser<br>155 | ser        | Gly        | Ile        | Gly        | Lys<br>160 |
| 20  |   | Lys        | Gly        | Lys        | Gln        | Pro<br>165 | Ala        | Lys                | Lys        | Arg        | Leu<br>170 | neA        | Phe        | Glu        | Glu        | Asp<br>175 | Thr        |
|     |   | Gly        | Ala        | Gly        | Asp<br>180 | Gly        | Pro        | Pro                | Glu        | Gly<br>185 | Ser        | Asp        | Thr        | Ser        | Ala<br>190 | Met        | Ser        |
| 25  |   | Ser        | Asp        | Ile<br>195 | Glu        | Met        | Arg        | Ala                | Ala<br>200 | Pro        | Gly        | eĵà        | Asn        | Ala<br>205 | Val        | Asp        | Ala        |
| 30  |   | Gly        | Gln<br>210 | Gly        | Ser        | Asp        | Gly        | <b>V</b> al<br>215 | Gly        | Asn        | Ala        | Ser        | Gly<br>220 | Asp        | Trp        | His        | Cys        |
| 25  |   | Asp<br>225 |            | Thr        | Trp        | Ser        | Glu<br>230 | Gly                | Lys        | Val        | Thr        | Thr<br>235 | Thr        | Ser        | Thr        | Arg        | Thr<br>240 |
| 35  |   | Trp        | Val        | Leu        | Pro        | Thr<br>245 | Tyr        | Asn                | Asn        | His        | Leu<br>250 | Tyr        | Leu        | Arg        | Leu        | Gly<br>255 | Thr        |
| 40  |   | Thr        | Ser        | Asn        | Ser<br>260 | Asn        | Thr        | Tyr                | neA        | Gly<br>265 | Phe        | Ser        | Thr        | Pro        | Trp<br>270 | Gly        | Tyr        |
| 45  |   | Phe        | Asp        | Phe<br>275 | Asn        | Arg        | Phe        | His                | Cys<br>280 | His        | Phe        | Ser        | Pro        | Arg<br>285 | Asp        | Trp        | Gln        |
| 45  |   | -          | Leu<br>290 | Ile        | Asn        | Asn        | Asn        | Trp<br>295         | eĵà        | Leu        | Arg        | Pro        | 100        | Ala        | Met        | Arg        | Val        |
| 50  |   | Lys<br>305 | Ile        | Phe        | Asn        | Ile        | Gln<br>310 | Val                | Lys        | Glu        | Val        | Thr<br>315 | Thr        | Ser        | Asn        | Gly        | Glu<br>320 |
| 55  | , | Thr        | Thr        | Val        | Ala        | Asn<br>325 | aeA        | Leu                | Thr        | Ser        | Thr<br>330 | Val        | G∫⊅        | Ile        | Phe        | Ala<br>335 | qeA        |
|     |   |            |            |            |            |            |            |                    |            |            |            |            |            |            |            |            |            |

|    | Ser          | Ser        | Tyr        | Glu<br>340 |            | Pro        | туг        | Val        | . Met<br>345 |            | Ala               | Gly        | / Glr      | 350        |            | Ser        |
|----|--------------|------------|------------|------------|------------|------------|------------|------------|--------------|------------|-------------------|------------|------------|------------|------------|------------|
| 5  | Leu          | Pro        | Pro<br>355 |            | Pro        | ne.A       | Asp        | Val<br>360 |              | Met        | . Val             | Pro        | Gln<br>365 |            | Gly        | Tyr        |
| 10 | Суз          | Gly<br>370 |            | Val        | Thr        | Gly        | Glu<br>375 |            | Gln          | Asn        | Gln               | Thr<br>380 |            | Arg        | Asn        | Ala        |
| 15 | Phe<br>385   |            | Суз        | Leu        | Glu        | Tyr<br>390 |            | Pro        | Ser          | Gln        | Met<br>395        | Leu        | Arg        | Thr        | Gly        | Asn<br>400 |
| 15 | Asn          | Phe        | eln        | Met        | Ala<br>405 | Tyr        | Asn        | Phe        | Glu          | Lys<br>410 | Val               | Pro        | Phe        | His        | Ser<br>415 | Met        |
| 20 | Tyr          | Ala        | His        | Ser<br>420 | Gln        | Ser        | Leu        | Asp        | Arg<br>425   | Leu        | Met               | Asn        | Pro        | Leu<br>430 | Leu        | Asp        |
| 25 | Gln          | Tyr        | Leu<br>435 | Trp        | His        | Leu        | Gln        | Ser<br>440 | Thr          | Thr        | Ser               | Gly        | Glu<br>445 | Thr        | Leu        | Asn        |
|    | Gln          | Gly<br>450 | Asn        | Ala        | Ala        | Thr        | Thr<br>455 | Phe        | Gly          | Lys        | Ile               | Arg<br>460 | Ser        | Gly        | Asp        | Phe        |
| 30 | Ala<br>465   | Phe        | Tyr        | Arg        | Lys        | Asn<br>470 | Trp        | Leu        | Pro          | Gly        | Pro<br>475        | Cys        | Val        | Lys        | Gln        | Gln<br>480 |
| 35 | Arg          | Phe        | Ser        | Lys        | Thr<br>485 | Ala        | Ser        | Gln        | Asn          | Tyr<br>490 | Lys               | Ile        | Pro        | Ala        | Ser<br>495 | Gly        |
|    | ely          | Asn        | Ala        | Leu<br>500 | Leu        | Lуз        | Tyr        | qeA        | Thr<br>505   | His        | Tyr               | Thr        | Leu        | Asn<br>510 | Asn        | Arg        |
| 40 | <br>Trp      |            | Asn<br>515 |            | Ala        | Pro        | Gly        | Pro<br>520 | Pro          | Met        | Ala               | Thr        | Ala<br>525 | Gly        | Pro        | Ser        |
| 45 | Ąsp          | Gly<br>530 | qeA        | Phe        | Ser        | Asn        | Ala<br>535 | Gln        | Leu          | Ile        | Phe               | Pro<br>540 | Gly        | Pro        | Ser        | Val        |
|    | Thr .<br>545 | Gly        | neA        | Thr        | Thr        | Thr<br>550 | Ser        | Ala        | Asn          | neA        | <b>Leu</b><br>555 | Leu        | Phe        | Thr        | Ser        | Glu<br>560 |
| 50 | Gly          | Glu        | Ile        |            | Ala<br>565 | Thr        | Asn        | Pro        | Arg          | Asp<br>570 | Thr               | Asp        | Met        | Phe        | Gly<br>575 | Gln        |
| 55 | Ile          | Ala        |            | Asn<br>580 | Asn        | Gln        | Asn        | Ala        | Thr<br>585   | Thr        | Ala               | Pro        | Ile        | Thr<br>590 | Gly        | Asn        |

|    |                               | Val        | The        | 595        | Met        | : Gly      | Val        | l Leu      | Pro<br>600 | Gly        | / Met      | : Val      | l Trp      | 605        |            | Arg        | g Asp      |
|----|-------------------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| 5  |                               | Ile        | Tyr<br>610 | Tyr        | : Gln      | Gly        | Pro        | Ile<br>615 | Trp        | Ala        | Lys        | Ile        | Pro<br>620 | His        | Ala        | Asp        | Gly        |
| 10 |                               | His<br>625 | Phe        | His        | Pro        | Ser        | Pro<br>630 | Leu        | Ile        | Gly        | Gly        | Phe<br>635 | Gly        | Leu        | Lys        | His        | Pro<br>640 |
|    |                               | Pro        | Pro        | Gln        | Ile        | Phe<br>645 | Ile        | Lys        | Asn        | Thr        | Pro<br>650 | Val        | Pro        | Ala        | Asn        | Pro<br>655 | Ala        |
| 15 |                               | Thr        | Thr        | Phe        | Thr<br>660 | Ala        | Ala        | Arg        | Val        | Asp<br>665 | Ser        | Phe        | Ile        | Thr        | Gln<br>670 | Tyr        | Ser        |
| 20 |                               | Thr        | ely        | Gln<br>675 | Val        | Ala        | Val        | Gln        | Ile<br>680 | Glu        | Trp        | Glu        | Ile        | Glu<br>685 | Lys        | Glu        | Arg        |
| 25 |                               | Ser        | Lys        | Arg        | Arg        | Asn        | Pro        | Glu<br>695 | Val        | Gln        | Phe        | Thr        | Ser<br>700 | Asn        | Tyr        | Gly        | Asn        |
| 25 |                               | Gln<br>705 | Ser        | Ser        | Met        | Leu        | Trp<br>710 | Ala        | Pro        | qeA        | Thr        | Thr<br>715 | Gly        | Lys        | Tyr        | Thr        | Glu<br>720 |
| 30 |                               | Pro        | Arg        | Val        | Ile        | Gly<br>725 | Ser        | Arg '      | Tyr        |            | Thr<br>730 | Asn        | His        | Leu        |            |            |            |
| 35 | <210> 6<br><211> 7<br><212> P | 33<br>RT   |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |
|    | <213> c<br><400> 6            |            | protein    | n of Av    | AV ser     | otype      | clone      | e C5VF     | P1@2       |            |            |            | ٠          |            |            |            |            |
| 40 |                               |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |

|    | Met<br>1  | Ala       | Ala       | qeA       | Gly<br>5  | Tyr       | Leu       | Pro       | qeA       | Trp<br>10 | Leu       | Glu       | qeA       | neA       | Leu<br>15 | Ser       |
|----|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| 5  | Glu       | Gly       | Ile       | Arg<br>20 | Glu       | Trp       | Trp       | Asp       | Leu<br>25 | Lys       | Pro       | Gly       | Ala       | Pro<br>30 | Lys       | Pro       |
| 10 | Lys       | Ala       | Asn<br>35 | Gln       | Gln       | Lys       | Gln       | Asp<br>40 | Asp       | Gly       | Arg       | Gly       | Leu<br>45 | Val       | Leu       | Pro       |
| •  | Gly       | туr<br>50 | Glu       | Tyr       | Leu       | Gly       | Pro<br>55 | Phe       | Asn       | ely       | Leu       | Asp<br>60 | Lys,      | Gly       | Glu       | Pro       |
| 15 | Val<br>65 | Asn       | Ala       | Ala       | Asp       | Ala<br>70 | Ala       | Ala       | Leu       | Glu       | His<br>75 | Asp       | Lys       | Ala       | Tyr       | qeA<br>08 |
| 20 | Gln       | Gln       | Leu       | Lys       | Ala<br>85 | Gly       | Asp       | Aśn       | Pro       | Tyr<br>90 | Leu       | Arg       | Tyr       | Asn       | His<br>95 | Ala       |
| 25 |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |

|            | Asp        | Ala        | Glu        | Phe<br>100 |            | Glu        | Arg        | Leu        | Gln<br>105 |            | Asp        | Thr        | Ser        | Phe<br>110 |            | Gly        |
|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| · ,        | Asn        | Leu        | Gly<br>115 |            | Ala        | Val        | Phe        | Gln<br>120 |            | Lys        | ГÀа        | Arg        | Val<br>125 |            | Glu        | Pro        |
| 10         | Leu        | Gly<br>130 |            | Val        | Glu        | Glu        | Gly<br>135 | Ala        | Lys        | Thr        | Ala        | Pro<br>140 | Gly        | Lys        | Lys        | Arg        |
| 15         | Pro<br>145 |            | Glu        | Ser        | Pro        | Gln<br>150 |            | Pro        | Asp        | Ser        | Ser<br>155 | Ser        | Gly        | Ile        | Gly        | Lys<br>160 |
|            | Lys        | Gly        | Lys        | Gln        | Pro<br>165 | Ala        | Lys        | Lys        | Arg        | Leu<br>170 | Asn        | Phe        | Glu        | Glu        | Asp<br>175 |            |
| 20         | Gly        | Ala        | Gly        | Asp<br>180 | Gly        | Pro        | Pro        | Glu        | Gly<br>185 | Ser        | Asp        | Thr        | Ser        | Ala<br>190 | Met        | Ser        |
| 25         | Ser        | Asp        | Ile<br>195 | Glu        | Met        | Arg        | Ala        | Ala<br>200 | Pro        | вĵу        | Gly        | Asn        | Ala<br>205 | Val        | Asp        | Ala        |
| . <u> </u> |            | Gln<br>210 | Gly        | Ser        | Asp        | Gly        | Val<br>215 | Gly        | Asn        | Ala        | Ser        | Gly<br>220 | Asp        | Trp        | His        | Суз        |
| 30 .       | Asp<br>225 | ser        | Thr        | Trp        | Ser        | Glu<br>230 | Gly        | Lys        | Val        | Thr        | Thr<br>235 | Thr        | Ser        | Thr        | Arg        | Thr<br>240 |
| 35         | Trp        | Val        | Leu        | Pro        | Thr<br>245 | Tyr        | Asn        | Asn        | His        | Leu<br>250 | Tyr        | Leu        | Arg        | Leu        | Gly<br>255 | Thr        |
|            | Thr        | ser        | Asn        | Ser<br>260 | Asn        | Thr        | Tyr        | Asn        | Gly<br>265 | Phe        | Ser        | Thr        | Pro        | Trp<br>270 | Gly        | Tyr        |
| 40         | Phe        | Asp        | Phe<br>275 | Asn        | Arg        | Phe        | His        | Cys<br>280 | His        | Phe        | Ser        | Pro        | Arg<br>285 | Азр        | Trp        | Gln        |
| 45         | Arg        | Leu<br>290 | Ile        | Asn        | Asn        | Asn        | Trp<br>295 | Gly        | Leu        | Arg        | Pro        | Lys<br>300 | Ala        | Met        | Arg        | Val        |
|            | Lys<br>305 | Ile        | Phe        | Asn        | Ile        | Gln<br>310 | Val        | Lys        | Glu        | Val        | Thr<br>315 | Thr        | Ser        | Asn        | Gly        | Glu<br>320 |
| 50         | Thr        | Thr        | Val        | Ala        | Asn<br>325 | Asn        | Leu        | Thr        | Ser        | Thr<br>330 | Val        | Gln        | Ile        | Phe        | Ala<br>335 | Asp        |
| 55         | Ser        | Ser        | Tyr        | Glu<br>340 | Leu        | Pro        | Tyr        | Val        | Met<br>345 | Asp        | Ala        | Gly        | Gln        | Glu<br>350 | Gly        | Ser        |

|    | Lei        | u Pro      | 355              |              | Pro               | Ası        | y Asp        | 360        |            | e Me       | t Val      | L Pro        | Glr<br>365 |            | c Gly      | / Tyr      |
|----|------------|------------|------------------|--------------|-------------------|------------|--------------|------------|------------|------------|------------|--------------|------------|------------|------------|------------|
| 5  | Cy:        | 370        | / Ile            | · Val        | Thr               | . G17      | / Glu<br>375 |            | a Glr      | a Ası      | a Glr      | 1 Thi<br>380 |            | Arg        | , Asr      | Ala        |
| 10 | Phe<br>385 | ≘ Туг<br>5 | : Cys            | Leu          | Glu               | Tyr<br>390 |              | Pro        | Ser        | : Glr      | 395        |              | Arg        | Thi        | : Gly      | Asn<br>400 |
|    | Asr        | n Phe      | Glu              | Thr          | Ala<br>405        |            | Asn          | Phe        | Glu        | Lys<br>410 |            | Pro          | Phe        | : His      | Ser<br>415 | Met        |
| 15 | Tyr        | : Ala      | His              | Ser<br>420   | Gln               | Ser        | Leu          | Asp        | Gly<br>425 |            | Met        | Asn          | Pro        | Leu<br>430 |            | qeA        |
| 20 | Gln        | Tyr        | Leu<br>435       | Trp          | His               | Leu        | Gln          | Ser<br>440 |            | Thr        | Ser        | Gly          | Glu<br>445 |            | Leu        | Asn        |
|    | Gln        | Gly<br>450 | Asn              | Ala          | Ala               | Thr        | Thr<br>455   | Phe        | Gly        | Lys        | Ile        | Arg<br>460   | Ser        | Gly        | Asp        | Phe        |
| 25 | Ala<br>465 | Phe        | Tyr              | Arg          | Lys               | Asn<br>470 | Trp          | Leu        | Pro        | Gly        | Pro<br>475 | Cys          | Val        | Lys        | Gln        | Gln<br>480 |
| 30 | Arg        | Phe        | Ser              | Lys          | Thr<br>485        | Ala        | Ser          | Gln        | Asn        | Tyr<br>490 | Lys        | Ile          | Pro        | Ala        | Ser<br>495 | Gly        |
|    | Gly        | Asn        | Ala              | Leu<br>500   | Leu               | Lys        | Tyr          | Asp        | Thr<br>505 | His        | Tyr        | Thr          | Leu        | Asn<br>510 | Asn<br>·   | Arg        |
| 35 | Trp        | Ser        | Asn<br>515       | Ile          | Ala               | Pro        | Gly          | Pro<br>520 | Pro        | Met        | Ala        | Thr          | Ala<br>525 | Ġly        | Pro        | Ser        |
| 40 | Asp        | Gly<br>530 | Asp              | Phe          | Ser               | Asn        | Ala<br>535   | Gln        | Leu        | Ile        | Phe        | Pro<br>540   | Gly        | Pro        | Ser        | Val        |
|    | Thr<br>545 | Gly        | Asn              | Thr          | Thr               | Thr<br>550 | Ser          | Ala        | Asn        | Asn        | Leu<br>555 | Leu          | Phe        | Thr        | Ser        | Glu<br>560 |
| 45 | Glu        | Glu        | Ile <sup>.</sup> | Ala          | <b>Ala</b><br>565 | Thr        | Asn          | Pro        | Arg        | Asp<br>570 | Thr        | Asp          | Met        | Phe        | Gly<br>575 | Gln        |
| 50 | Ile        | Ala        | qeA              | Asn .<br>580 | Asn               | Gln        | Asn          | Ala        | Thr<br>585 | Thr        | Ala        | Pro          | Ile        | Thr<br>590 | Gly        | Asn        |
| ÷  | Val        | Thr        | Ala :<br>595     | Met          | Gly               | Val        | Leu          | Pro<br>600 | Gly        | Met        | Val        | Trp          | Gln<br>605 | Asn        | Arg        | qeA        |
| 55 |            |            |                  |              |                   |            |              |            |            |            |            |              |            |            |            |            |

|    |           | Ile        | Tyr<br>610       | Tyr        | Gln        | Gly        | Pro        | Ile<br>615 |            | Ala        | Lys        | Ile        | Pro<br>620 | His        | Ala        | Asp        | Gly        |
|----|-----------|------------|------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| 5  |           | His<br>625 | Phe              | His        | Pro        | Ser        | Pro<br>630 | Leu        | Ile        | Gly        | Gly        | Phe<br>635 | Gly        | Leu        | Lys        | His        | Pro<br>640 |
| 10 |           | Pro        | <sub>(</sub> Pro | Gln        | Ile        | Phe<br>645 | Ile        | Lys        | Asn        | Thr        | Pro<br>650 |            | Pro        | Ala        | Tyr        | Pro<br>655 | Ala        |
|    |           | Thr        | Thr              | Phe        | Thr<br>660 | Ala        | Ala        | Arg        | Val        | Asp<br>665 | Ser        | Phe        | Ile        | Thr        | Gln<br>670 | туг        | Ser        |
| 15 |           | Thr        | Gly              | Gln<br>675 | Val        | Ala        | Val        | Gln        | Ile<br>680 | Glu        | Trp        | Glu        | Ile        | Glu<br>685 | Lys        | Glu<br>:   | Arg        |
| 20 |           | Ser        | Lys<br>690       | Arg        | Trp        | Asn        | Pro        | Glu<br>695 | Val        | Gln        | Phe        | Thr        | Ser<br>700 | Asn        | Cys        | Gly        | Asn        |
|    |           | Gln<br>705 | Ser              | Ser        | Met        | Leu        | Trp<br>710 | Ala        | Pro        | Asp        | Thr        | Thr<br>715 | Gly        | Lys        | Tyr        | Thr        | Glu<br>720 |
| 25 |           | Pro        | Arg              | Val        | Ile        | Gly<br>725 | Ser        | Arg        | Tyr        |            | Thr<br>730 | Asn        | His        | Leu        |            |            |            |
|    | <210> 63  |            |                  |            |            |            |            |            |            |            |            |            |            |            |            |            |            |
| 30 | <211> 734 | 4.         |                  |            |            |            |            |            |            |            |            |            |            |            |            |            | •          |
|    | <212> PR  |            |                  |            |            |            |            |            |            |            |            |            |            |            |            |            |            |
|    | <213> car | osid pr    | otein            | of AA      | V serc     | otype,     | clone      | AAV4       | VP1        |            |            |            |            |            |            |            |            |
|    | <400> 63  |            |                  |            |            |            |            |            |            |            | •          |            |            |            |            |            |            |
| 35 |           |            |                  |            |            |            |            |            |            |            |            |            |            |            |            |            |            |
|    |           |            |                  | •          |            |            |            | •          |            |            |            |            |            |            |            |            |            |
|    |           |            |                  |            |            |            |            |            |            |            |            |            | •          |            |            |            | •          |

|            | Met<br>1  | Thr        | qeA       | Gly        | Tyr<br>5  | Leu       | Pro        | Asp       | Trp        | Leu<br>10 | Glu       | qeA       | neA       | Leu        | Ser<br>15 | Glu       |
|------------|-----------|------------|-----------|------------|-----------|-----------|------------|-----------|------------|-----------|-----------|-----------|-----------|------------|-----------|-----------|
| 5          | Gly       | Val        | Arg       | Glu<br>20  | Trp       | Trp       | Ala        | Leu       | Gln<br>25  | Pro       | Gly       | Ala       | Pro       | Lys<br>30  | Pro       | Lys       |
| 10         | Ala       | Asn        | Gln<br>35 | Gln        | His       | Gln       | qeA        | Asn<br>40 | Ala        | Arg       | Gly       | Leu       | Val<br>45 | Leu        | Pro       | ejà       |
|            | Tyr       | L ys<br>50 | Tyr       | Leu        | Gly       | Pro       | Gly<br>\$5 | neA       | Gly        | Leu       | Asp       | E0<br>Lys | Gly       | Glu        | Pro       | Val       |
| 15         | Asn<br>65 | Ala        | Ala       | qeA        | Ala       | Ala<br>70 | Ala        | Leu       | Glu        | His       | Asp<br>75 | Lys       | Ala       | Tyr        | Ąsp       | Gln<br>80 |
| 20         | Gln       | Leu        | Lys       | Ala        | Gly<br>85 | qeA       | Asn        | Pro       | Tyr        | Leu<br>90 | Lys       | Tyr       | neA       | His        | Ala<br>95 | qeA       |
|            | Äla       | Glu        | Phe       | Gln<br>100 | Gln       | Arg       | Leu        | Gln       | Gly<br>105 | Asp       | Thr       | Ser       | Phe       | Gly<br>110 | ejÀ       | Asn       |
| 25         |           |            |           |            |           |           |            |           |            |           |           |           |           |            |           |           |
| 30         |           |            |           |            |           |           |            |           |            |           |           |           |           |            |           |           |
| 35         |           |            |           |            |           |           |            |           |            |           |           |           |           |            |           |           |
| <b>5</b> 0 |           |            |           |            |           |           |            |           |            |           |           |           |           |            |           |           |

|            |   | ŗe,        | л СТ            | y Ar<br>11 |              | a Va       | l Ph         | e Gl:      | n Al.<br>12 | -          | s Ly         | s Arq        | y Va       | 1 Let<br>12: |            | u Pr          | o Lei        |
|------------|---|------------|-----------------|------------|--------------|------------|--------------|------------|-------------|------------|--------------|--------------|------------|--------------|------------|---------------|--------------|
| 5          |   | G1         | y Le<br>13      | u Va.<br>O | l Gli        | n e1:      | n Al         | a Gl;      |             | u Th       | r Al         | a Pro        | ) Gly      |              | 3 Ly:      | s Ar          | g Pro        |
| 10         |   | Le:        | ı Ile           | e Gli      | u Sei        | r Pro      | 0 Gli<br>150 |            | n Pro       | ) As       | p Se         | r Ser<br>155 |            | c Gly        | / Il       | e <b>G</b> 1; | y Lys<br>160 |
|            |   | Lys        | s Gly           | / Ly:      | s Glr        | 1 Pro      |              | A Lys      | 3 Lys       | 3 Ly       | s Let<br>170 |              | Phe        | e Glu        | . Asp      | 5 Gl:<br>175  | 1 Thr        |
| 15         |   | Gly        | / Ala           | a Gly      | / Asp<br>180 | Gly        | y Pro        | Pro        | Glu         | 185        |              | Thr          | Ser        | : Gly        | Ala<br>190 |               | : Ser        |
| 20         |   | ĄsĄ        | As <sub>t</sub> | Ser<br>195 | Glu          | Met        | : Arg        | Ala        | Ala<br>200  |            | Gly          | , Gly        | Ala        | Ala<br>205   |            | . Glu         | . Glà        |
|            |   | Gly        | Gln<br>210      | Gly        | Ala          | Asp        | Gly          | Val<br>215 | Gly         | Asn        | Ala          | Ser          | Gly<br>220 |              | Trp        |               | Cys          |
| 25         |   | Asp<br>225 | Ser             | Thr        | Trp          | Ser        | Glu<br>230   | Gly        | His         | Val        | . Thr        | Thr<br>235   | Thr        | Ser          | Thr        | Arg           | Thr<br>240   |
| 30         |   | Trp        | Val             | Leu        | Pro          | Thr<br>245 | Tyr          | Asn        | Asn         | His        | Leu<br>250   |              | Lys        | Arg          | Leu        | Gly<br>255    | Glu          |
|            |   | Ser        | Leu             | Gln        | Ser<br>260   | Asn        | Thr          | Tyr        | neA         | Gly<br>265 |              | Ser          | Thr        | Pro          | Trp<br>270 | Gly           | Tyr          |
| 35         |   | Phe        | qeA             | Phe<br>275 | Asn          | Arg        | Phe          | His        | Cys<br>280  | His        | Phe          | Ser          | Pro        | Arg<br>285   | qeA        | Trp           | Gln          |
| 40         |   | Arg        | Leu<br>290      | Ile        | Asn          | asa        | Asn          | Trp<br>295 | Gly         | Met        | Arg          | Pro          | 300<br>Lys | Ala          | Met        | Arg           | Val          |
|            |   | Lys<br>305 | Ile             | Phe        | Asn          | Ile        | Gln<br>310   | Val        | Lys         | Glu        | Val          | Thr<br>315   | Thr        | Ser          | Asn        | Gly           | Glu<br>320   |
| 45         |   | Thr        | Thr             | Val        | Ala          | Asn<br>325 | Asn          | Leu        | Thr         | Ser        | Thr<br>330   | Val          | Gln        | Ile          | Phe        | Ala<br>335    | Asp          |
| 50         |   | Ser        | Ser             | Tyr        | Glu<br>340   | Leu        | Pro          | Tyr        |             | Met<br>345 | Asp          | Ala          | Gly        |              | Glu<br>350 | Gly           | Ser          |
|            | • | Leu        | Pro             | Pro<br>355 | Phe          | Pro        | Asn          |            | Val<br>360  | Phe        | Met          | Val          | Pro        | Gln<br>365   | Tyr        | Gly           | Tyr          |
| <b>5</b> 5 |   |            |                 |            |              |            |              |            |             |            |              |              |            |              |            |               |              |

|      | Cya        | G1y<br>370 |            | Val        | . Thr      | Gly          | / Asn<br>375 |            | : Ser      | Gl:        | ı Glm        | 380<br>380 |            | Asp        | Arg        | neA t             |
|------|------------|------------|------------|------------|------------|--------------|--------------|------------|------------|------------|--------------|------------|------------|------------|------------|-------------------|
| 5    | Ala<br>385 |            | Tyr        | Cya        | Leu        | . Glu<br>390 |              | Phe        | Pro        | Ser        | : Gln<br>395 |            | : Lev      | Arg        | Thr        | Gly<br>400        |
| . 10 | Asn        | Asn        | Phe        | Glu        | Ile<br>405 |              | Tyr          | Ser        | Phe        | Glu<br>410 |              | Val        | . Pro      | Phe        | His<br>415 | Ser               |
| 15   | Met        | Tyr        | Ala        | His<br>420 |            | Gln          | Ser          | Leu        | Asp<br>425 |            | Leu          | Met        | Asn        | Pro<br>430 | Leu        | Ile               |
|      | Asp        | Gln        | Tyr<br>435 | Lеи        | Trp        | eĵà          | Leu          | Gln<br>440 |            | Thr        | Thr          | Thr        | Gly<br>445 |            | Thr        | Leu               |
| 20   | Asn        | Ala<br>450 |            | Thr        | Ala        | Thr          | Thr<br>455   | neA        | Phe        | Thr        | Lys          | Leu<br>460 |            | Pro        | Thr        | Asn               |
| 25   | Phe<br>465 | Ser        | neA        | Phe        | Lys        | Lys<br>470   | Asn          | Trp        | Leu        | Pro        | Gly<br>475   | Pro        | Ser        | Ile        | Lys        | Gln<br>480        |
|      | Gln        | Gly        | Phe        | Ser        | Lys<br>485 | Thr          | Ala          | Asn        | Gln        | Asn<br>490 | Tyr          | Lys        | Ile        | Pro        | Ala<br>495 | Thr               |
| 30   | Gly        | Ser        | qeA        | Ser<br>500 | Leu        | Ile          | Lys          | Tyr        | Glu<br>505 | Thr        | His          | Ser        | Thr        | Leu<br>510 | Asp        | Gly               |
| 35   | Arg        | Trp        | Ser<br>515 | Ala        | Leu        | Thr          | Pro          | Gly<br>520 | Pro        | Pro        | Met          | Ala        | Thr<br>525 | Ala        | Gly        | Pro               |
|      | Ala        | Дзр<br>530 | Ser        | Lys        | Phe        | Ser          | Asn<br>535   | Ser        | Gln        | Leu        | Ile          | Phe<br>540 | Ala        | Gly        | Pro        | Lys .             |
| 40   | Gln<br>545 | Asn        | Gly        | Asn        | Thr        | Ala<br>550   | Thr          | Val        | Pro        | Gly        | Thr<br>555   | Leu        | Ile        | Phe        | Thr        | <b>Ser</b><br>560 |
| 45   | Glu        | Glu        | Glu        | Leu        | Ala<br>565 | Ala          | Thr          | Asn        | Ala        | Thr<br>570 | Asp          | Thr        | Asp        | Met        | Trp<br>575 | Gly               |
|      | Asn        | Leu        | Pro        | Gly<br>580 | Gly        | Asp          | Gln          | Ser        | Asn<br>585 | Ser        | neA          | Leu        |            | Thr<br>590 | Val        | Asp               |
| 50   | Arg        | Leu        | Thr<br>595 | Ala        | Leu        | GΙЪ          | Ala          | Val<br>600 | Pro        | GJÀ        | Met          | Val        | Trp<br>605 | Gln        | Asn        | Arg               |
| 55   | Asp        | Ile<br>610 | Tyr        | Tyr        | Gln        | Сĵу          | Pro<br>615   | Ile        | Trp        | Ala        |              | Ile<br>620 | Pro        | His        | Thr        | Asp               |
|      |            |            |            |            |            |              |              |            |            |            |              |            |            |            |            |                   |

| 5              |                                  | Gly<br>625                                 |                                | Phe                | His                            | Pro                                  | Ser<br>630                     | Pro                            | Leu                            | Ile                                   | Gly                    | Gly<br>635                     | Phe                     | Gly                            | Leu                            | Lys                      | His<br>640               |
|----------------|----------------------------------|--------------------------------------------|--------------------------------|--------------------|--------------------------------|--------------------------------------|--------------------------------|--------------------------------|--------------------------------|---------------------------------------|------------------------|--------------------------------|-------------------------|--------------------------------|--------------------------------|--------------------------|--------------------------|
|                |                                  | Pro                                        | Pro                            | Pro                | Gln                            | Ile<br>645                           | Phe                            | Ile                            | Lys                            | Asn                                   | Thr<br>650             |                                | Val                     | Pro                            | Ala                            | Asn<br>655               |                          |
| 10             |                                  | Ala                                        | Thr                            | Thr                | Phe<br>660                     |                                      | Ser                            | Thr                            | Pro                            | Val<br>665                            | Asn                    | Ser                            | Phe                     | Ile                            | Thr<br>670                     | Gln                      | Tyr                      |
| 15             |                                  | Ser                                        | Thr                            | Gly<br>675         |                                | Val                                  | Ser                            | Val                            | Gln<br>680                     | Ile                                   | Asp                    | Trp                            | Glu                     | Ile<br>685                     | Gln                            | Lys                      | Glu                      |
|                |                                  | Arg                                        | Ser<br>690                     |                    | Arg                            | Trp                                  | Asn                            | Pro<br>695                     | Glu                            | Val                                   | Gln                    | Phe                            | Thr<br>700              | Ser                            | Asn                            | Tyr                      | Gly                      |
| 20             |                                  | Gln<br>705                                 | Gln                            | aeA                | Ser                            | Leu                                  | Leu<br>710                     | Trp                            | Ala                            | Pro                                   | qeA                    | Ala<br>715                     | Ala                     | Gly                            | Lys                            | Tyr                      | Thr<br>720               |
| 25             |                                  | Glu                                        | Pro                            | Arg                | Ala                            | Ile<br>725                           | Gly                            | Thr                            | Arg                            | Туг                                   | Leu<br>730             | Thr                            | His                     | His                            | Leu                            |                          |                          |
|                | <210> 64<br><211> 73<br><212> PI | 36<br>RT                                   |                                |                    |                                |                                      |                                |                                |                                |                                       |                        |                                |                         |                                |                                |                          |                          |
| 30             | <213> ca                         | apsid p                                    | rotein                         | of AA              | V ser                          | otype,                               | clone                          | AAV                            | 1                              |                                       |                        |                                |                         |                                |                                |                          |                          |
|                | <400> 64                         | 1                                          |                                |                    |                                |                                      |                                |                                |                                |                                       |                        |                                |                         |                                |                                |                          |                          |
|                | <400> 64                         |                                            |                                |                    |                                |                                      |                                |                                |                                |                                       |                        |                                |                         |                                |                                |                          |                          |
| 35             | <400> 64                         |                                            | Ala                            | Ala                |                                |                                      | Tyr                            | Leu                            | Pro                            | Asp                                   | Trp<br>10              | Leu                            | Glu                     | Asp                            | Asn                            | Leu<br>15                | Ser                      |
|                | <400> 64                         | Met<br>1                                   |                                |                    | Asp                            | Gly<br>5                             |                                |                                |                                |                                       | 10                     |                                |                         |                                |                                |                          |                          |
|                | <400> 64                         | Met<br>1<br>Glu                            | Gly                            | Ile                | Asp<br>Arg<br>20               | Gly<br>5                             | Trp                            | Trp                            | qeA                            | Leu<br>25                             | 10<br>Lys              | Pro                            | Ġly                     | Ala                            | Pro<br>30                      | 15                       | Pro                      |
| 35             | <400> 64                         | Met<br>1<br>Glu<br>Lys                     | Gly<br>Ala                     | Ile<br>Asn<br>35   | Arg<br>20<br>Gln               | Gly<br>5<br>Glu<br>Gln               | Trp<br>Lys                     | Trp<br>Gln                     | Asp<br>Asp<br>40               | Leu<br>25<br>Asp                      | lys<br>Gly             | Pro<br>Arg                     | Gly                     | Ala<br>Leu<br>45               | Pro<br>30<br>Val               | Lys                      | Pro<br>Pro               |
| <i>35</i>      | <400> 64                         | Met<br>1<br>Glu<br>Lys                     | Gly<br>Ala<br>Tyr<br>50        | Ile<br>Asn<br>35   | Asp<br>Arg<br>20<br>Gln<br>Tyr | Gly<br>5<br>Glu<br>Gln<br>Leu        | Trp<br>Lys<br>Gly              | Trp<br>Gln<br>Pro<br>55        | Asp<br>Asp<br>40               | Leu<br>25<br>Asp<br>Asn               | Lys<br>Gly<br>Gly      | Pro<br>Arg<br>Leu              | Gly<br>Gly<br>Asp       | Ala<br>Leu<br>45<br>Lys        | Pro<br>30<br>Val               | Lys<br>Leu<br>Glu        | Pro<br>Pro               |
| <i>35</i>      | <400> 64                         | Met<br>1<br>Glu<br>Lys<br>Gly<br>Val<br>65 | Gly<br>Ala<br>Tyr<br>50<br>Asn | Ile Asn 35 Lys     | Asp<br>20<br>Gln<br>Tyr        | Gly<br>5<br>Glu<br>Gln<br>Leu        | Trp<br>Lys<br>Gly<br>Ala       | Trp<br>Gln<br>Pro<br>55        | Asp<br>40<br>Phe               | Leu<br>25<br>Asp<br>Asn<br>Leu        | Lys<br>Gly<br>Gly      | Pro<br>Arg<br>Leu<br>His<br>75 | cly<br>Gly<br>Asp<br>Oo | Ala<br>Leu<br>45<br>Lys        | Pro<br>30<br>Val<br>Gly        | Lys<br>Leu<br>Glu        | Pro<br>Pro<br>Pro<br>Asp |
| 35<br>40<br>45 | <400> 64                         | Met<br>l<br>Glu<br>Lys<br>Gly<br>Val<br>65 | Gly<br>Ala<br>Tyr<br>50<br>Asn | Ile Asn 35 Lys Ala | Asp<br>20<br>Gln<br>Tyr<br>Ala | Gly<br>5<br>Glu<br>Gln<br>Leu<br>Asp | Trp<br>Lys<br>Gly<br>Ala<br>70 | Trp<br>Gln<br>Pro<br>55<br>Ala | Asp<br>40<br>Phe<br>Ala<br>Asn | Leu<br>25<br>Asp<br>Asn<br>Leu<br>Pro | Lys Gly Gly Glu Tyr 90 | Pro Arg Leu His 75             | Gly Gly Asp 60 Asp      | Ala<br>Leu<br>45<br>Lys<br>Lys | Pro<br>30<br>Val<br>Gly<br>Ala | Lys<br>Leu<br>Glu<br>Tyr | Pro Pro Asp 80           |

| 5         |   | Leu        | Gly<br>130 | Leu        | Val        | Glu        | Glu        | Gly<br>135        | Ala        | Lys        | Thr        | Ala        | Pro<br>140 | Gly        | Lys        | Lys        | Arg        |
|-----------|---|------------|------------|------------|------------|------------|------------|-------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
|           |   | Pro<br>145 | Val        | Glu        | Gln        | ser        | Pro<br>150 |                   | Glu        | Pro        | Asp        | Ser<br>155 | Ser        | ser        | Gly        | Ile        | Gly<br>160 |
| 10        |   | Lys        | Thr        | Gly        | Gln,       | Gln<br>165 | Prò        | Ala               | Lys        | Lys        | Arg<br>170 | Leu        | Asn        | Phe        | Gly        | Gln<br>175 | Thr        |
| 15        |   | Gly        | Asp        | ser        | Glu<br>180 | Ser        | Val        | Pro               | Asp        | Pro<br>185 | Gln        | Pro        | Leu        | Gly        | Glu<br>190 | Pro        | Pro        |
|           |   | Ala        | Thr        | Pro<br>195 | Ala        | Ala        | Val        | Gly               | Pro<br>200 | Thr        | Thr        | Met        | Ala        | Ser<br>205 | Gly        | Gly        | Gly        |
| 20        |   | Ala        | Pro<br>210 | Met        | Ala        | qeA        | Asn        | Asn<br>215        | Glu        | Gly        | Ala        | Ąsp        | Gly<br>220 | Val        | Gly        | neA        | Ala        |
| 25        |   | Ser<br>225 | Gly        | Asn        | Trp        | His        | Cys<br>230 | qeA               | Ser        | Thr        | Trp        | Leu<br>235 | еĵà        | Asp        | Arg        | Val        | Ile<br>240 |
|           |   | Thr        | Thr        | Ser        | Thr        | Arg<br>245 | Thr        | Trp               | Ala        | Leu        | Pro<br>250 | Thr        | Tyr        | Asn        | Asn        | His<br>255 | Leu        |
| 30        |   | Tyr        | Lуз        | Gln        | 11e<br>260 | Ser        | Ser        | Ala               | Ser        | Thr<br>265 | elà        | Ala        | Ser        | Asn        | Asp<br>270 | Asn        | His        |
| <i>35</i> |   | Tyr        | Phe        | Gly<br>275 | Tyr        | Ser        | Thr        | Pro               | Trp<br>280 | Gly        | Tyr        | Phe        | qeA        | Phe<br>285 | Asn        | Arg        | Phe        |
|           |   |            | 290        |            | Phe        |            |            | 295               | -          | •          |            |            | 300        |            |            |            |            |
| 40        |   | Trp<br>305 | Gly        | Phe        | Arg        | Pro        | Lys<br>310 | Arg               | Leu        | Asn        | Phe        | Lys<br>315 | Leu        | Phe        | Asn        | Ile        | Gln<br>320 |
| 45        |   |            |            |            | Val        | 325        |            |                   | -          |            | 330        |            |            |            |            | 335        |            |
|           |   | Leu        | Thr        | Ser        | Thr<br>340 | Val        | Gln        | Val               | Phe        | Ser<br>345 | Asp        | Ser        | Glu        | Tyr        | Gln<br>350 | Leu        | Pro        |
| 50        | ÷ | Tyr        | Val        | Leu<br>355 | Gly        | Ser        | Ala        | His               | Gln<br>360 | Gly        | Суз        | Leu        | Pro        | Pro<br>365 | Phe        | Pro        | Ala        |
| 55        |   | Asp        | Val<br>370 | Phe        | Met        | Ile        | Pro        | <b>Gln</b><br>375 | Tyr        | Gly        | Tyr        | Leu        | Thr<br>380 | Leu        | Asn        | neA        | Gly        |

| 5         | 385        |                    | Ala         | . Val      | GЈУ        | 390        |            | Ser        | Phe        | Tyr        | 395        | Leu        | . Gla      | Tyr         | Phe        | 400        |
|-----------|------------|--------------------|-------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|-------------|------------|------------|
| ,         | Ser        | Gln                | Met         | Leu        | Arg<br>405 |            | Gly        | Asn        | neA .      | Phe<br>410 |            | Phe        | ser        | Tyr         | Thr<br>415 | Phe        |
| 10        | Glu        | Glu                | Val         | Pro<br>420 |            | His        | Ser        | Ser        | Tyr<br>425 |            | His        | Ser        | Gln        | Ser<br>430  | Leu        | Asp        |
| 15        | Arg        | Leu                | Met<br>435  |            | Pro        | Leu        | Ile        | Asp<br>440 | Gln        | Tyr        | Leu        | Tyr        | Tyr<br>445 | Leu         | neA        | Arg        |
|           | Thr        | Gln<br>450         |             | Gln        | Ser        | Gly        | Ser<br>455 | Ala        | Gln        | Asn        | Lys        | Asp<br>460 |            | Leu         | Phe        | Ser        |
| 20        | Arg<br>465 |                    | Ser         | Pro        | Ala        | Gly<br>470 | Met        | Ser        | Val        | Gln        | Pro<br>475 | Lys        | Asn        | Ţŗp         | Leu        | Pro<br>480 |
| 25        | Gly        | Pro                | Cys         | Tyr        | Arg<br>485 | Gln        | Gln        | Arg        | Val        | Ser<br>490 | Lys        | Thr        | Lys        | Thr         | Asp<br>495 | Asn        |
|           |            | neA<br>            |             | Asn<br>500 | Phe        | Thr        | Trp        | Thr        | Gly<br>505 | Ala        | Ser        | ГÀЗ        | Tyr        | Asn<br>510  | Leu        | neA        |
| 30        | Gly        | Arg                | Glu<br>515  | Ser        | Ile        | Ile        | Asn        | Pro<br>520 | Gly        | Thr        | Ala        | Met        | Ala<br>525 | Ser         | His        | Lys        |
| <i>35</i> | Asp        | де <b>Д</b><br>530 | €1 <i>n</i> | Asp        | Lys        | Phe        | Phe<br>535 | Pro        | Met        | Ser        | Gly        | Val<br>540 | Met        | Ile         | Phe        | Gly        |
|           | Lys<br>545 | Glu                | Ser         | Ala        | Gly        | Ala<br>550 | Ser        | Asn        | Thr        | Ala        | Leu<br>555 | Ąsp        | neA        | Val         | Met        | Ile<br>560 |
| 40        | Thr        | Asp                | Glu         | Glu        | Glu<br>565 | Ile        | Lys        | Ala        | Thr        | Asn<br>570 | Pro        | Val        | Ala        | Thr         | Glu<br>575 | Arg        |
| 45        | Phe        | GJÀ                | Thr         | Val<br>580 | Ala        | Val        | neA        | Phe        | Gln<br>585 | Ser        | Ser        | Ser        | Thr        | <b>qe 4</b> | Pro        | Ala        |
|           | Thr        | вſУ                | Asp<br>595  | Val        | His        | Ala        | Met        | 600<br>GJÀ | Ala        | Leu        | Pro        | GЉ         | Met<br>605 | Val         | Trp        | Gln        |
| 50        | Asp        | Arg<br>610         | qeA         | Val        | Tyr        | Leu        | Gln<br>615 | GJĀ        | Pro        | Ile        | Trp        | Ala<br>620 | Lys        | Ile         | Pro        | His        |
| 65        | Thr<br>625 | Asp                | Gly         | His        | Phe        | His<br>630 | Pro        | Ser        | Pro        | Leu        | Met<br>635 | Gly        | Gly        | Phe         | Gly        | Leu<br>640 |

| 5    |                         | Lys        | neA        | Pro        | Pro        | Pro<br>645 | Gln        | Ile        | Leu        | Ile        | Lys<br>650 | Asn        | Thr        | Pro        | Val        | Pro<br>655 | Ala        |
|------|-------------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
|      |                         | Asn        | Pro        | Pro        | Ala<br>660 | Glu        | Phe        | Ser        | Ala        | Thr<br>665 | Lya        | Phe        | Ala        | Ser        | Phe<br>670 | Ile        | Thr        |
| 10   |                         | Gln        | Tyr        | ser<br>675 | Thr        | Gly        | Gln        | val        | Ser<br>680 | Val        | Glu        | Ile        | Glu        | Trp<br>685 | Glu        | Leu        | Gln        |
| 15 . |                         | Lys        | Glu<br>690 | Asn        | Ser        | Lys        | Arg        | Trp<br>695 | Asn        | Pro        | Glu        | Val        | Gln<br>700 | Tyr        | Thr        | ser        | aeA        |
|      |                         | Tyr<br>705 | Ala        | Lys        | Ser        | Ala        | Asn<br>710 | Val        | Asp        | Phe        | Thr        | Val<br>715 | Asp        | Asn        | neA        | Gly        | Leu<br>720 |
| 20   |                         | Tyr        | Thr        | Glu        | Pro        | Arg<br>725 | Pro        | Ile        | Gly        | Thr        | Arg<br>730 | Tyr        | Leu        | Thr        | Arg        | Pro<br>735 | Leu        |
|      | <210> 65<br><211> 736   |            |            |            | -          |            |            |            |            |            |            |            |            |            |            |            |            |
| 25   | <212> PRT<br><213> caps |            | tein of    | AAV        | seroty     | pe, cl     | one A      | AV6VI      | P1         |            |            |            |            |            |            |            |            |
|      | <400> 65                |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |
| 30   |                         |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |

|           | Met<br>1    | Ala        | Ala        | Asp        | Gly<br>5  | Tyr       | Leu        | Pro         | Asp        | Trp<br>10 | Leu       | Glu        | Asp        | Asn        | Leu<br>15 | Ser       |
|-----------|-------------|------------|------------|------------|-----------|-----------|------------|-------------|------------|-----------|-----------|------------|------------|------------|-----------|-----------|
| <i>5</i>  | Glu         | Gly        | Ile        | Arg<br>20  | Glu       | Trp       | Trp        | Asp         | Leu<br>25  | Lys       | Pro       | Gly        | Ala        | Pro<br>30  | Lys       | Pro       |
| ,<br>10   | Lys         | Ala<br>,   | Asn<br>35  | Gln        | Gln       | Lys       | Gln        | Asp<br>40   | Asp        | Gly       | Arg       | Gly        | Leu<br>45  | Val        | Leu       | Pro       |
|           | <i>e</i> 1y | Tyr<br>50  | ГÀЗ        | Tyr        | Leu       | Gly       | Pro<br>55  | Phe         | Asn        | Gly       | Leu       | Asp<br>60  | Lys        | Gly        | Glu       | Pro       |
| 15        | Val<br>65   | Asn        | Ala        | Ala        | Asp       | Ala<br>70 | Ala        | Ala         | Leu        | Glu       | His<br>75 | Asp        | Lys        | Ala        | Tyr       | Asp<br>80 |
| 20        | Gln         | Gln        | Leu        | Lys        | Ala<br>85 | Gly       | qeA        | Asn         | Pro        | Tyr<br>90 | Leu       | Arg        | Tyr        | Asn        | His<br>95 | Ala       |
|           | Asp         | Ala        | Glu        | Phe<br>100 | Gln       | Glu       | Arg        | Le <i>u</i> | Gln<br>105 | e)n       | qeA       | Thr        | Ser        | Phe<br>110 | Gly       | Gly       |
| 25        | Asn         | Leu        | Gly<br>115 | Arg        | Ala       | Val       | Phe        | Gln<br>120  | Ala        | Lys       | Lys       | Arg        | Val<br>125 | Leu        | Glu       | Pro       |
| 30        | Phe         | Gly<br>130 | Leu        | Val        | Glu       | Glu       | Gly<br>135 | Ala         | Lys        | Thr       | Ala       | Pro<br>140 | Gly        | Lys        | Lys       | Arg       |
|           |             |            |            |            |           |           |            |             |            |           |           |            |            |            |           |           |
| <i>35</i> |             |            |            |            |           |           |            |             |            |           |           |            |            |            |           |           |

| 5         |   | Pro<br>145 |            | . Glu      | ı Gln      | Ser        | 150        |            | Glu        | Pro        | Asr        | Ser<br>155 |            | : Sex      | : Gly      | Ile        | : Gly<br>160 |
|-----------|---|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|--------------|
|           | • | ГУз        | The        | G1y        | , GJw      | Gln<br>165 |            | Ala        | Lys        | Lys        | 170        |            | Asn        | Phe        | Gly        | Gln<br>175 | Thr          |
| 10        |   | Gly        | Asp        | Ser        | Glu<br>180 |            | Val        | Pro        | qeA        | Pro<br>185 |            | Pro        | Leu        | Gly        | Glu<br>190 |            | Pro          |
| 15        |   | Ala        | Thr        | Pro<br>195 |            | Ala        | Val        | Gly        | Pro<br>200 |            | Thr        | Met        | Ala        | Ser<br>205 |            | Gly        | Gly          |
|           |   |            | Pro<br>210 | Met        | Ala        | Asp        | Asn        | Asn<br>215 | Glu        | вĵу        | Ala        | qeA        | Gly<br>220 | Val        | Gly        | Asn        | Ala          |
| 20        | • | Ser<br>225 | Gly        | neA        | Trp        | His        | Суя<br>230 | Asp        | Ser        | Thr        | Trp        | Leu<br>235 | Gly        | Asp        | Arg        | Val        | Ile<br>240   |
| 25        |   | Thr        | Thr        | Ser        | Thr        | Arg<br>245 | Thr        | Trp        | Ala        | Leu        | Pro<br>250 | Thr        | Tyr        | aeA        | Asn        | His<br>255 | Leu          |
|           |   | Tyr        | Lys        | Gln        | Ile<br>260 | Ser        | ser        | Ala        | Ser        | Thr<br>265 | Gly        | Ala        | Ser        | neA        | Asp<br>270 | Asn        | His          |
| 30        |   | Tyr        | Phe        | Gly<br>275 | Tyr        | Ser        | Thr        | Pro        | Trp<br>280 | Gly        | Tyr        | Phe        | qeA        | Phe<br>285 | Asn        | Arg        | Phe          |
| 35        |   | His        | Cys<br>290 | His        | Phe        | Ser        | Pro        | Arg<br>295 | qeA        | Trp        | Gln        | Arg        | 300<br>200 | Ile        | Asn        | Asn        | Asn          |
|           |   | Trp<br>305 | Gly        | Phe        | Arg        | Pro        | Lys<br>310 | Arg        | Leu        | neA        | Phe        | Lys<br>315 | ren        | Phe        | neA        | Ile        | Gln<br>320   |
| 40        |   | Val        | Lys        | Glu        | Val        | Thr<br>325 | Thr        | neA        | qeA        | Gly        | Val<br>330 | Thr        | Thr        | Ile        | Ala        | Asn<br>335 | Asn          |
| 45        |   | Leu        | Thr        | Ser        | Thr<br>340 | Val        | Gln        | Val        | Phe        | Ser<br>345 | qeA        | Ser        | Glu        | Tyr        | Gln<br>350 | Leu        | Pro          |
|           |   | туг        | Val        | Leu<br>355 | Gly        | Ser        | Ala        | His        | Gln<br>360 | Gly        | Суз        | Leu        | Pro        | Pro<br>365 | Phe        | Pro        | Ala          |
| <b>50</b> |   | Asp        | Val<br>370 | Phe        | Met        | Ile        |            | Gln<br>375 | Туг        | Gly        | Tyr        |            | Thr<br>380 | Leu        | Asn        | Asn        | Gly          |
| 55        |   | Ser<br>385 | Gln        | Ala        | Val        | G] y       | Arg<br>390 | Ser        | Ser        | Phe        | Tyr        | Cys<br>395 | Leu        | Glu        | Tyr        | Phe        | Pro<br>400   |
|           |   |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |              |

|    |   | S           | er G       | ln Me       | et Le      | u Ar<br>40   | Th         | r Gl        | y As       | an As        | an Ph<br>41  | ne Th         | ur Pi      | ne Se      | er Ty             | /r Tl<br>43 | nr Phe<br>L5 |
|----|---|-------------|------------|-------------|------------|--------------|------------|-------------|------------|--------------|--------------|---------------|------------|------------|-------------------|-------------|--------------|
| 5  |   | G           | lu A:      | sp Va       | l Pr<br>42 | o Phe<br>O   | Hi:        | s Se        | r Se       | r Ty<br>42   | r Al         | .a H <u>i</u> | s Se       | r Gl       | n Se<br>43        |             | qeA ue       |
| 10 |   | Aı          | g Le       | eu Me<br>43 | t As<br>5  | n Pro        | Let        | ı Il        | e As<br>44 | p G1<br>0    | n Ty         | r Le          | u Ty       | r Ty<br>44 |                   | eA u        | n Arg        |
|    |   | Th          | r Gl<br>45 | n As<br>0   | n Gl       | n Ser        | Gly        | 7 Se:<br>45 | r Al       | a Gl         | n As         | n Ly          | 3 As<br>46 | p Le<br>O  | u Le              | u Ph        | e Ser        |
| 15 |   | Ar<br>46    | g Gl<br>5  | y Se        | r Pro      | Ala          | Gly<br>470 | Met         | : Se:      | r Va         | l Gl         | n Pro<br>475  | b Ly:      | s As       | n Tr              | ) Le        | u Pro<br>480 |
| 20 |   | Gl          | y Pr       | o Cys       | з Туг      | Arg<br>485   | Gln        | Glr         | Arq        | y Val        | 1 Se:        | Lys           | Th         | r Lys      | 3 Thi             | Asj<br>495  | Asn<br>5     |
|    |   | As          | n Ası      | n Ser       | Asn<br>500 | Phe          | Thr        | Trp         | Thi        | : Gly<br>505 | / Ala        | . Ser         | Lys        | Tyr        | Asn<br>510        |             | 1 Asn        |
| 25 |   | Gl          | y Arg      | 515         | Ser        | Ile          | Ile        | Asn         | Pro<br>520 | Gly          | Thr          | Ala           | Met        | Ala<br>525 |                   | His         | Lys          |
| 30 |   | <b>Z</b> SA | 530        | Lys         | Asp        | Lys          | Phe        | Phe<br>535  | Pro        | Met          | Ser          | Gly           | Val<br>540 | Met        | Ile               | Phe         | Gly          |
|    |   | Lys<br>545  | Glu        | Ser         | Ala        | Gly          | Ala<br>550 | Ser         | Asn        | Thr          | Ala          | Leu<br>555    | Asp        | Asn        | Val               | Met         | Ile<br>560   |
| 35 | • | Thr         | Asp        | Glu         | Glu        | Glu<br>565   | Ile        | Lys         | Ala        | Thr          | Asn<br>570   | Pro           | Val        | Ala        | Thr               | Glu<br>575  | Arg          |
| 40 |   | Phe         | Gly        | Thr         | Val<br>580 | Ala v        | Val .      | Asn         | Leu        | Gln<br>585   | Ser          | Ser           | Ser        | Thr        | <b>Asp</b><br>590 | Pro         | Ala          |
|    |   | Thr         | Gly        | Asp<br>595  | Val        | His \        | /al 1      | Met         | Gly<br>600 | Ala          | Leu          | Pro           | Gly        | Met<br>605 | Val               | Trp         | Gln          |
| 45 |   | Asp         | Arg<br>610 | Asp         | Val        | Tyr I        | eu (       | Sln<br>615  | Gly        | Pro          | Ile          | Trp           | Ala<br>620 | Lys        | Ile               | Pro         | His          |
| 50 |   | Thr<br>625  | qeA        | Gly         | His        | Phe H<br>6   | is E<br>30 | Pro         | Ser        | Pro          | Leu          | Met (         | Gly        | Gly        | Phe -             |             | Leu<br>640   |
|    |   | Lys         | His        | Pro         | Pro :      | Pro G<br>645 | ln I       | le 1        | Leu :      | Ile :        | Lys :<br>650 | Asn :         | fhr        | Pro '      |                   | Pro :       | Ala          |
| 55 |   |             |            |             |            |              |            |             |            |              |              |               |            |            |                   |             |              |

| 5           |           | Asn        | Pro        | Pro        | Ala<br>660 | Glu        | Phe        | Ser         | Ala        | Thr<br>665 | Lys        | Phe               | Ala        | Ser        | Phe<br>670 | Ile        | Thr        |
|-------------|-----------|------------|------------|------------|------------|------------|------------|-------------|------------|------------|------------|-------------------|------------|------------|------------|------------|------------|
|             |           | Gln        | Tyr        | Ser<br>675 | Thr        | Gly        | Gln        | Val         | Ser<br>680 | Val        | Glu        | Ile               | Glu        | Trp<br>685 | Glu        | Leu        | Gln        |
| 10          | ·         | Lys        | Glu<br>690 | Asn        | Ser        | Lys        | Arg        |             | Asn        | Pro        | Glu        | Val               | Gln<br>700 | Tyr        | Thr        | Ser        | Asn        |
| 15          |           | Tyr<br>705 | Ala        | Lys        | Ser        | Ala        | Asn<br>710 | Val         | Asp        | Phe        | Thr        | <b>Val</b><br>715 | Asp        | Asn        | Asn        | Gly        | Leu<br>720 |
|             |           | Tyr        | Thr        | Glu        | Pro        | Arg<br>725 | Pro        | Ile         | Gly        | Thr        | Arg<br>730 | Tyr               | Leu        | Thr        | Arg        | Pro<br>735 | Leu        |
| 20          |           |            |            |            |            |            |            |             |            |            |            |                   |            |            |            |            |            |
| 20          | <210> 66  |            |            |            |            |            |            |             |            |            |            |                   |            |            |            |            |            |
|             | <211> 735 | 5          |            |            |            |            |            |             |            |            |            |                   |            |            |            |            |            |
|             | <212> PR  |            |            |            |            |            |            |             |            |            |            |                   |            |            |            |            |            |
| ·           | <213> cap | sid pr     | otein d    | of AAV     | serot      | ype, c     | lone A     | <b>\3.3</b> |            |            |            |                   |            |            |            |            |            |
| 25          |           |            |            |            |            |            |            |             |            |            |            |                   |            |            |            |            |            |
|             | <400> 66  |            |            |            |            |            |            |             |            |            |            |                   |            |            |            |            |            |
|             |           |            |            |            |            |            |            |             |            |            |            |                   |            |            |            |            |            |
| •           |           |            |            |            |            |            |            |             |            |            |            |                   |            |            |            |            |            |
| 30          |           |            |            |            |            |            |            |             |            |            |            |                   |            |            |            | ,          |            |
|             |           |            |            |            |            |            |            |             |            |            |            |                   |            |            |            |            |            |
|             |           |            |            |            |            |            |            |             |            |            |            |                   |            |            |            |            |            |
| 25 /        | ,         |            |            |            |            |            |            |             |            |            |            |                   |            |            |            |            |            |
| <i>35</i> ′ |           |            |            |            |            |            |            |             |            |            |            |                   |            |            |            |            |            |

|      | Met<br>1  | Ala        | Ala        | qeA        | Gly<br>5  | Tyr          | Leu        | Pro        | Asp        | Trp<br>10        | Leu       | Glu        | Asp        | Thr        | Leu<br>15 | Ser       |
|------|-----------|------------|------------|------------|-----------|--------------|------------|------------|------------|------------------|-----------|------------|------------|------------|-----------|-----------|
| 5    | Glu       | Gly        | Ile        | Arg<br>20  | Gln       | Trp          | Trp        | Lys        | Leu<br>25  | Lya              | Pro       | GJA        | Pro        | Pro<br>30  | Pro       | Pro       |
| 10   | Lys       | Pro        | Asn<br>35  | Gln        | Gln       | His          | Arg        | Asp<br>40  | Asp        | Ser              | Arg       | Gly        | Leu<br>45  | Val        | Leu       | Pro       |
|      | Gly       | Tyr<br>50  | Lys        | Tyr        | Leu       | Gly          | Pro<br>55  | Phe        | Asn        | Gly              | Leu       | Asp<br>60  | Lys        | Gly        | Glu       | Pro       |
| 15   | Val<br>65 | Asn        | Glu        | Ala        | Ąsp       | Ala<br>70    | Ala        | Ala        | Leu        | Glu              | His<br>75 | Asp        | Lys        | Ala        | Tyr       | Asp<br>80 |
| 20   | His       | Gln        | Leu        | Lys        | Gln<br>85 | <b>G</b> J A | Asp        | Asn        |            | Tyr<br>90        | Leu       | Lys        | Tyr        | Asn        | His<br>95 | Ala       |
|      | Asp       | Ala        | Glu        | Phe<br>100 | Gln       | Glu          | Arg        | Leu        | Gln<br>105 | Glu <sub>.</sub> | Asp       | Thr        |            | Phe<br>110 | Gly       | Gly       |
|      | Asn       | Leu        | Gly<br>115 | Arg .      | Ala       | Val          | Phe        | Gln<br>120 | Ala        | Lys              | Lys .     |            | Val<br>125 | Leu        | Glu       | Pro       |
| 30 . | Leu       | Gly<br>130 | Leu        | Val        | Glu       | Glu          | Ala<br>135 | Val        | Lys        | Thr .            |           | Pro<br>140 | Gly        | Lys        | Lys       | Arg       |
|      |           | •          |            |            |           |              |            |            |            |                  |           |            |            |            | ·         |           |

*5* 

.

| 5  | Pro<br>145   |              | Glu          | Gln        | Ser        | 2 Pro        |            | Glu        | ı Pro      | Asp        | Ser<br>155   |              | Ser        | : Gly       | y Ile                      | e Gly<br>160 |
|----|--------------|--------------|--------------|------------|------------|--------------|------------|------------|------------|------------|--------------|--------------|------------|-------------|----------------------------|--------------|
| 3  | Lys          | Ser          | Gly          | Gln        | Gln<br>165 |              | Ala        | Lys        | Lys        | 170        |              | Asn          | Phe        | e Gly       | Glr<br>175                 | n Thr        |
| 10 | Gly          | Asp          | Thr          | Glu<br>180 |            | Val          | Pro        | Gly        | Pro<br>185 |            | Pro          | Ile          | Gly        | 'Glu<br>190 |                            | > Pro        |
| 15 | Ala          | Ala          | Pro<br>195   | Ser        | Gly        | Val          | Gly        | Ser<br>200 |            | Thr        | Met          | Ala          | Ser<br>205 | _           | Gly                        | , Gly        |
| 13 | Ala          | Pro<br>210   | Met          | Ala        | qeA        | Asn          | Asn<br>215 | Glu        | Gly        | Ala        | Asp          | Gly<br>220   | Val        | Gly         | Asn                        | Ser          |
| 20 | Ser<br>225   | Gly          | Asn          | Trp        | His        | Cys<br>230   | Asp        | Ser        | Thr        | Trp        | Met<br>235   | Gly          | qzA        | Arg         | Val                        | Ile<br>240   |
| 25 | Thr          | Thr          | Ser          | Thr        | Arg<br>245 | Thr          | Trp        | Ala        | Leu        | Pro<br>250 | Thr          | Tyr          | Asn        | Asn         | His<br>255                 |              |
|    | Tyr          | ГÀЗ          | Gln          | Ile<br>260 | Ser        | Ser          | Glu        | Ser        | Gly<br>265 | Ala        | Thr          | Asn          | qeA        | Asn<br>270  | His                        | Tyr          |
| 30 | Phe          | Gly          | Tyr<br>275   | Ser        | Thr        | Pro          | Trp        | Gly<br>280 | Tyr        | Phe        | Asp          | Phe          | Asn<br>285 | Arg         | Phe                        | His          |
| 35 | Cys          | His<br>290   | Phe          | Ser        | Pro        | Arg          | Asp<br>295 | Trp        | Gln        | Arg        | Leu          | Ile<br>300   | Asn        | neA         | Asn                        | Trp          |
|    | Gly<br>305   | Phe .        | Arg          | Pro .      | Lys        | Lys<br>310   | Leu        | Asn        | Phe<br>,   | Lys        | Leu<br>315   | Phe          | Asn        | Ile         | Gln                        | Val<br>320   |
| 40 | Lys (        | Glu '        | Val          |            | Gln<br>325 | Asn          | Asp        | Gly        | Thr        | Thr<br>330 | Thr          | Ile          | Ala        | Asn.        | <b>As</b> n<br><b>33</b> 5 | Leu          |
| 45 | Thr          | Ser 2        | Ala '        | Val<br>340 | Gln        | Val          | Phe        | Thr        | Asp<br>345 | ser        | Glu          | Tyr          | Gln        | Leu<br>350  | Pro                        | Tyr          |
|    | Val 1        | Leu (        | Gly :<br>355 | Ser .      | Ala        | His          | Gln        | Gly<br>360 | Суз        | Leu        | Pro          | Pro          | Phe<br>365 | Pro         | Ala                        | Asp          |
| 50 | Val :        | Phe 1<br>370 | Met :        | Ile        | Pro        |              | Tyr<br>375 | Gly '      | Tyr        | Leu        |              | Leu .<br>380 | Asn        | Asn         | Gly                        | Ser          |
| 55 | Gln 7<br>385 | lla V        | Val (        | Gly 2      |            | Ser :<br>390 | Ser        | Phe '      | Tyr (      |            | Leu (<br>395 | Slu '        | Tyr        | Phe         | Pro                        | Ser<br>400   |

| 5  | Gln               | Met          | Leu          | Arg         | Thx<br>405 | _          | ' Asn      | Asn        | Phe               | 410        |                   | : Ser      | Tyr                | Thr        | Phe<br>415 | Glu        |
|----|-------------------|--------------|--------------|-------------|------------|------------|------------|------------|-------------------|------------|-------------------|------------|--------------------|------------|------------|------------|
|    | Asp               | Val          | Pro          | Phe<br>420  | His        | Ser        | Ser        | Tyr        | Ala<br>425        |            | Ser               | Gln        | . Ser              | 130        |            | Arg        |
| 10 | Leu               | Met          | Asn<br>435   | Pro         | Leu        | Ile        | Asp        | Gln<br>440 |                   | Leu        | Tyr               | Tyr        | Leu<br>445         |            | Lys        | Thr        |
| 15 | Gln               | Gly<br>450   | Thr          | Ser         | Gly        | Thr        | Thr<br>455 | Gln        | Gln               | Ser        | Arg               | Leu<br>460 |                    | Phe        | Ser        | GJu        |
|    | Ala<br>465        |              | Pro          | Ser         | Ser        | Met<br>470 |            | Gln        | Gln               | Ala        | <b>Lys</b><br>475 |            | Trp                | Leu        | Pro        | Gly<br>480 |
|    | Pro               | Ser          | Tyr          | Arg         | Gln<br>485 | Gln        | Arg        | Met        | Ser               | Lys<br>490 |                   | Ala        | neA                | Asp        | Asn<br>495 |            |
| 25 | Asn               | Ser          | Glu          | Phe<br>500  | Ala        | Trp        | Thr        | Ala        | <b>Ala</b><br>505 | Thr        | Lys               | Tyr        | Tyr                | Leu<br>510 | Asn        | Gly        |
|    | Arg               | Asn          | Ser<br>515   | Leu         | Val        | Asn        | Pro        | Gly<br>520 | Pro               | Pro        | Val               | Ala        | Ser<br>525         | His        | Lys        | Asp        |
| 30 | Asp               | Glu<br>530   | Glu          | Lys         | Tyr        | Phe        | Pro<br>535 | Met        | His               | Gly        | Asn               | Leu<br>540 | Ile                | Phe        | Gly        | ГÀЗ        |
| 35 | Gln<br>545        | Gly          | Thr          | Gly         | Thr        | Thr<br>550 | Asn        | Val        | qeA               | Ile        | Glu<br>555        | Ser        | Val                | Leu        | Ile        | Thr<br>560 |
|    | qeA               | Glu          | Glu          | Glu         | Ile<br>565 | Arg        | Thr        | Thr        | Asn               | Pro<br>570 | Val               | Ala        | Thr                | Glu        | Gln<br>575 | Tyr        |
| 40 | Gly               | Gln '        | Val :        | Ala<br>580  | Thr        | Asn        | His        |            | Ser<br>585        | Gln        | Asn               | Thr        | Thr                | Ala<br>590 | Ser        | Tyr        |
| 45 | Gly               | Ser '        | Val 1<br>595 | qe <i>A</i> | Ser        | Gln        |            | Ile<br>600 | Leu               | Pro        | Gly               | Met        | <b>V</b> al<br>605 | Trp        | Gln        | qeA        |
|    | Arg               | Asp \<br>610 | Val :        | Tyr :       | Leu        |            | Gly<br>615 | Pro        | Ile '             | Trp .      | Ala               | Lys<br>620 | Thr                | Pro        | His        | Thr        |
| 50 | <b>Asp</b><br>625 | Gly I        | His 1        | Phe 1       |            | Pro :      | Ser        | Pro :      | Leu 1             |            | Gly<br>635        | Gly        | Phe                | Сlу        | Leu        | Lys<br>640 |
| 55 | His               | Pro 1        | Pro 1        |             | 51n<br>645 | Ile :      | Leu        | Ile :      |                   | Asn<br>650 | Thr               | Pro        | Val                |            | Ala<br>655 | neA        |

| 5           |           | Pro        | Ala        | Thr        | Thr<br>660 | Phe        | Thr        | Pro        | GJĀ        | Lys<br>665  |            | Ala        | Ser        | Phe        | Ile<br>670 | Thr        | Gln        |
|-------------|-----------|------------|------------|------------|------------|------------|------------|------------|------------|-------------|------------|------------|------------|------------|------------|------------|------------|
|             |           | Tyr        | Ser        | Thr<br>675 | Gly        | Gln        | Val        | Ser        | Val<br>680 | Glu         | Ile        | Glu        | Trp        | Glu<br>685 | Leu        | Gln        | Lys        |
| 10          |           | Glu        | Asn<br>690 | Ser        | Lys        | Arg        | Trp        | Asn<br>695 | Pro        | Glu         | Ile        | G]μ        | TYF<br>700 | Thr        | Ser        | Asn        | Tyr        |
| . 15        |           | Asn<br>705 | Lys        | Ser        | Val        | Asn        | Val<br>710 | Glu        | Phe        | Th <i>r</i> | Val        | Asp<br>715 | Ala        | Asn        | Gly        | Val        | Tyr<br>720 |
|             |           | Ser        | Glu        | Pro        | Arg        | Pro<br>725 | Ile        | Gly        | Thr        | Arg         | Tyr<br>730 | Leu        | Thr        | Arg        | Asn        | Leu<br>735 |            |
| 20          |           |            |            |            |            |            |            |            |            |             |            |            |            |            |            |            |            |
|             | <210> 67  |            |            |            |            |            |            |            |            |             |            |            |            |            |            |            |            |
|             | <211> 735 |            |            |            |            |            |            |            |            |             |            |            |            |            |            |            |            |
|             | <212> PRT |            |            |            |            |            |            |            |            |             |            |            |            |            |            |            |            |
| 25          | <213> cap | sid pro    | otein c    | of AAV     | serot      | ype, c     | lone A     | \3.7       |            |             |            |            |            |            |            |            |            |
|             | <400> 67  |            |            |            |            |            |            |            |            |             |            |            |            |            |            |            |            |
|             |           |            |            |            |            |            |            |            |            | ,           |            |            |            |            |            |            |            |
| <i>30</i> · |           |            |            |            |            |            |            |            |            |             |            |            |            |            |            |            |            |

|    | Met<br>1   | Ala        | Ala        | qeA        | Gly<br>5  | Tyr        | Leu        | Pro        | Asp        | Trp<br>10 | Leu        | Glu        | Asp        | Thr        | Leu<br>15 | Sea        |
|----|------------|------------|------------|------------|-----------|------------|------------|------------|------------|-----------|------------|------------|------------|------------|-----------|------------|
| 5  | Glu        | Gly        | Ile        | Arg<br>20  | Gln       | Txp        | Trp        | Lys        | Leu<br>25  | Lys       | Pro        | Gly        | Pro        | Pro<br>30  | Pro       | Pro        |
| 10 | Lys        | Pro        | Asn<br>35  | Gln        | Gln       | His        | Arg        | Asp<br>40  | Asp        | Ser       | Arg        | ,<br>ela   | Leu<br>45  | Val        | Leu       | Pro        |
|    | Gly        | Tyr<br>50  | Lys        | Tyr        | Leu       | Gly        | Pro<br>55  | Phe        | neA        | Gly       | Leu        | Asp<br>60  | Lys        | Gly        | Glu       | Pro        |
| 15 | Val<br>65  | neA        | Glu        | Ala        | qeA       | Ala<br>70  | Ala        | Ala        | Leu        | Glu       | His<br>75  | qвЯ        | Lys        | Ala        | Tyr       | qeA<br>08  |
| 20 | His        | Gln        | Leu        | Lys        | Gln<br>85 | Gly        | Asp        | Asn        | Pro        | Tyr<br>90 | Leu        | Lys        | Tyr        | Asn        | His<br>95 | Ala        |
|    | qeA        | Ala        | Glu        | Phe<br>100 | Gln       | Glu        | Arg        | Leu        | Gln<br>105 | Glu       | Asp        | Thr        | Ser        | Phe<br>110 | Gly       | Gly        |
| 25 | Asn        | Leu        | Gly<br>115 | Arg        | Ala       | Val        | Phe        | Gln<br>120 | Ala        | Lys       | Lys        | Arg        | Val<br>125 | Leu        | Glu       | Pro        |
| 30 | Leu        | Gly<br>130 | Leu        | Val        | Glu       | Glu        | Ala<br>135 | Val        | Lys        | Thr       | Ala        | Pro<br>140 | Gly        | Lys        | Lys       | Arg        |
|    | Pro<br>145 | Ile        | Glu        | Gln        | Ser       | Pro<br>150 | Ala        | Glu        | Pro        |           | Ser<br>155 | Ser        | Ser        | Gly        |           | Gly<br>160 |
| 35 |            |            |            |            |           |            |            |            | ٠          |           |            |            |            |            |           |            |

|           | Ly         | s Sei      | Gly        | y Glz        | 165        | n Pro      | Ala               | a Lys        | Lys        | 170        |            | l Ası      | n Phe      | e Gly        | y Glr<br>175 |            |
|-----------|------------|------------|------------|--------------|------------|------------|-------------------|--------------|------------|------------|------------|------------|------------|--------------|--------------|------------|
| 5         | Gly        | y Asp      | Th:        | 6 Glu<br>180 |            | Val        | Pro               | Asp          | Pro<br>185 |            | Pro        | Ile        | e Gly      | / Gli<br>190 |              | Pro        |
| 10        | Ala        | Ala        | Pro<br>195 |              | : Gly      | , Awj      | 'G1'              | / Ser<br>200 |            | Thr        | : Met      | Ala        | 205        |              | / Gly        | Gly        |
| 15        | Ala        | 210        |            | : Ala        | Asp        | Asn        | <b>Asn</b><br>215 |              | Gly        | Ala        | Asp        | Gly<br>220 |            | Gly          | / Asn        | Ser        |
|           | Ser<br>225 |            | Asn        | Trp          | His        | Cys<br>230 |                   | Ser          | Thr        | Trp        | Met<br>235 | Gly        | Asp        | Arg          | Val          | Ile<br>240 |
| 20        | Thr        | Thr        | Ser        | Thr          | Arg<br>245 | Thr        | Trp               | Ala          | Leu        | Pro<br>250 |            | Tyr        | Asn        | Asn          | Arg<br>255   | Leu        |
|           | туг        | Lys        | Gln        | Ile<br>260   |            | Ser        | Glu               | Ser          | Gly<br>265 |            | Thr        | Asn        | qeA        | Asn<br>270   |              | Tyr        |
| 25        | Phe        | Gly        | туr<br>275 | Ser          | Thr        | Pro        | Trp               | Gly<br>280   | Tyr        | Phe        | 'Asp       | Phe        | Asn<br>285 | Arg          | Phe          | His        |
| 30        | Cys        | His<br>290 | Phe        | Ser          | Pro        | Arg        | Asp<br>295        | Trp          | Gln        | Arg        | Leu        | Ile<br>300 | Asn        | Asn          | <b>Asn</b>   | Trp        |
| <i>35</i> | Gly<br>305 | Phe        | Arg        | Pro          | Lys        | Lys<br>310 | Leu               | Asn          | Phe        | Lys        | Leu<br>315 | Phe        | Asn        | Ile          | Gln          | Val<br>320 |
|           | Lys        | Glu        | Val        | Thr          | Gln<br>325 | Asn        | Asp               | Gly          | Thr        | Thr<br>330 | Thr        | Ile        | Ala        | Asn          | Asn<br>335   | Leu        |
| 40        | Thr        | Ser        | Thr        | Val<br>340   | Gln        | Val        | Phe               |              | Asp<br>345 | Ser        | Glu        | Tyr        | Gln        | Leu<br>350   | Pro          | Tyr        |
| 45        | Val        |            | Gly<br>355 | Ser          | Ala        | His        | Gln               | 360          | Суз        | Leu        | Pro        | Pro        | Phe<br>365 | Pro          | Ala          | Asp        |
|           | Val        | Phe<br>370 | Met        | Ile          | Pro        | Gln        | Tyr<br>375        | Gly          | Tyr        | Leu        | Thr        | Leu<br>380 | Asn        | Asn          | Gly          | Ser        |
| 50        | Gln<br>385 | Ala        | Val        | Gly          | Arg        | Ser<br>390 | Ser               | Phe          | Tyr        | Суз        | Leu<br>395 | Glu        | Tyr        | Phe          | Pro          | Ser<br>400 |
|           | Gln        | Met        | Leu        | Arg          | Thr<br>405 | Gly        | Asn               | Asn          | Phe        | Thr<br>410 | Phe        | Ser        | Tyr        | The          | Phe<br>415   | Glu        |

|    |  | As         | p Va       | l Pr       | o Ph<br>42 | e Hi<br>O  | s Se       | r Se         | т Ту       | r Al<br>42 | a Hi<br>5  | s Se       | r Gl         | n Se       | r Le<br>43 |            | p Arg      |
|----|--|------------|------------|------------|------------|------------|------------|--------------|------------|------------|------------|------------|--------------|------------|------------|------------|------------|
| 5  |  | Le         | u Me       | t As:      | n Pro      | ) Le       | u Il       | e Ası        | Gl:<br>440 | n Ty:      | r Le       | и ту:      | r Ty         | r Let      |            | r Ly       | s Thr      |
| 10 |  | Gli        | n Gl<br>45 | y Th:      | r Sei      | c Gly      | y Th       | r Thi<br>455 | Glr        | n Gla      | n Se       | r Arg      | J Let<br>460 |            | n iPhe     | e Se       | r Gln      |
| ٠  |  | Ala<br>465 | a Gly      | y Pro      | Ser        | : Ser      | Me1        | E Ala        | Gln        | Glr        | n Ala      | 475        |              | Trp        | Lev        | ı Pro      | Gly<br>480 |
| 15 |  | Pro        | Sei        | Tyr        | : Arg      | Gln<br>485 | Glr        | Arg          | Met        | Ser        | Lys<br>490 |            | Ala          | . Asn      | , Asp      | Asr<br>495 | Asn        |
| 20 |  | Asn        | ser        | , Glu      | Phe<br>500 | Ala        | Trp        | Thr          | Ala        | Ala<br>505 | Thr        | : Lys      | Tyr          | Tyr        | Leu<br>510 |            | Gly        |
|    |  | Arg        | . Asn      | Ser<br>515 | Leu        | Val        | neA        | Pro          | Gly<br>520 | Pro        | Pro        | Met        | Ala          | Ser<br>525 |            | Lys        | Asp        |
| 25 |  | Asp        | Glu<br>530 | Glu        | Lys        | Tyr        | Phe        | Pro<br>535   | Met        | His        | Gly        | Asn        | Leu<br>540   |            | Phe        | Gly        | Lys        |
| 30 |  | Gln<br>545 | Gly        | Thr        | ely        | Thr        | Thr<br>550 | Asn          | Val        | qeA        | Ile        | Glu<br>555 | Ser          | Val        | Leu        | Ile        | Thr<br>560 |
|    |  | Asp        | Glu        | Glu        | Glu        | Ile<br>565 | Arg        | Thr          | Thr        | Asn        | Pro<br>570 | Val        | Ala          | Thr        | Glu        | Gln<br>575 | Tyr        |
| 35 |  | Gly        | Gln        | Val        | Ala<br>580 | Thr        | Asn        | His          | Gln        | Ser<br>585 | Gln        | Asn        | Thr          | Thr        | Ala<br>590 | Ser        | Tyr        |
| 40 |  | ely        | Ser        | Val<br>595 | Asp        | Ser        | Gln        | Gly          | Ile<br>600 | Leu        | Pro        | Gly        | Met          | Val<br>605 | Trp        | Gln        | Asp        |
|    |  | Arg        | Asp<br>610 | Val        | Tyr        | Leu        | Gln        | Gly<br>615   | Pro        | Ile        | Trp        | Ala        | Lys<br>620   | Thr        | Pro        | His        | Thr        |
| 45 |  | Asp<br>625 | Gly        | His        | Phe        | His        | Pro<br>630 | Ser          | Pro        | Leu        | Met        | Gly<br>635 | Gly          | Phe        | Gly        | Leu        | Lys<br>640 |
| 50 |  | His        | Pro        | Pro        | Pro        | Gln<br>645 | Ile        | Leu          | Ile        | Lys        | Asn<br>650 | Thr        | Pro          | Val        | Pro        | Ala<br>655 | Asn        |
|    |  | Pro        | Ala        | Thr        | Thr<br>660 | Phe        | Thr        | Pro (        | sly :      | Lys<br>665 | Phe        | Ala .      | Ser          |            | Ile<br>670 | Thr        | Gln        |
| EE |  |            |            |            |            |            |            |              |            |            |            |            |              |            |            |            |            |

|         |                                  | Tyr        | Ser        | Thr<br>675 |            | Gln        | Val        | Ser        | Val<br>680 |            | Ile        | Glu        | Trp        | 61u<br>685 |            | Glr        | ı Lys      |
|---------|----------------------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| 5       |                                  | Glu        | Asn<br>690 | Ser        | Lys        | Arg        | Trp        | Asn<br>695 |            | Glu        | Ile        | Gln        | Tyr<br>700 | Thr        | Ser        | : Asn      | Tyr        |
| 10      |                                  | Asn<br>705 | Гуs<br>`   | Ser        | Val        | Asn        | Val<br>710 | Glu        | Phe        | Thr        | Val        | Asp<br>715 | Ala        | Asn        | Gly        | Val        | Tyr<br>720 |
|         |                                  | Ser        | Glu        | Pro        | Arg        | Pro<br>725 | Ile        | Gly        | Thr        | Arg        | Tyr<br>730 | Leu        | Thr        | Arg        | Asn        | Leu<br>735 |            |
|         | <210> 68<br><211> 73<br><212> PI | 35<br>RT   |            | -£ 0.0     |            | -4         |            |            |            |            |            |            |            |            |            |            |            |
| 20      | <213> ca                         |            | oten       | 01 77      | v sen      | окуре,     | Cione      | A3.4       |            |            |            |            |            |            |            |            |            |
| 25      |                                  | Met<br>1   | Ala        | Ala        | Asp        | Gly<br>5   | Tyr        | Leu        | Pro        | Asp        | Trp<br>10  | Leu        | Glu        | qeA        | Thr        | Leu<br>15  | Ser        |
|         |                                  | Glu        | Gly        | Ile        | Arg<br>20  | Gln        | Trp        | Trp        | Lys        | Leu<br>25  | Lys        | Pro        | Gly        | Pro        | Pro<br>30  | Pro        | Pro        |
| 30      |                                  | Lys        | Pro        | Asn<br>35  | Gln        | Gln        | His        | Arg        | Asp<br>40  | Asp        | Ser        | Arg        | Gly        | Leu<br>45  | Val        | Leu        | Pro        |
| •<br>35 |                                  | Gly        | Tyr<br>50  | Lys        | Tyr        | Leu        | GŢĀ        | Pro<br>55  | Phe        | Asn        | Gly        | Leu        | Asp<br>60  | Lys        | Gly        | Glu        | Pro        |
|         |                                  | Val<br>65  | Asn        | Glu        | Ala        | Asp        | Ala<br>70  | Ala        | Ala        | Leu        | Glu        | His<br>75  | Ąsp        | Lys        | Ala        | Tyr        | Asp<br>80  |
| 40      |                                  | His        | Gln        | Leu        | Lys        | Gln<br>85  | Gly        | Ązp        | Asn        | Pro        | Tyr<br>90  | Leu        | Lys        | Tyr<br>    | Asn        | His<br>95  | Ala        |
| 45      |                                  | Asp        | Ala        | Glu        | Phe<br>100 | Gln        | Glu        | Arg        | Leu        | Gln<br>105 | Glu        | qeA        | Thr        | Ser        | Phe<br>110 | Gly        | Gly        |
|         |                                  | Asn        | Leu        | Gly<br>115 | Arg        | Ala        | Val        | Phe        | Gln<br>120 | Ala        | Lys        | Lys        | Arg        | Val<br>125 | Leu        | Glu        | Pro        |
| 50      |                                  | Leu        | Gly<br>130 | Leu        | Val        | Glu        | Glu        | Ala<br>135 | Val        | Lys        | Thr        | Ala        | Pro<br>140 | Gly        | Lys        | Lys        | Arg        |
| 55      |                                  | Pro<br>145 | Ile        | Glu        | Gln        | Ser        | Pro<br>150 | Ala        | Glu        | Pro        | qeA        | Ser<br>155 | Ser        | Ser        | Gly        | Ile        | Gly<br>160 |
|         |                                  | Glu        | Ser        | Gly        | Gln        | Gln<br>165 | Pro        | Ala        | Lys        | Lys        | Arg<br>170 | Leu        | Asn        | Phe        | Gly        | Gln<br>175 | Thr        |

| £  |   | G17        | / Asp | Thr        | : Glu<br>180 |            | · Val      | l Pro      | ) Asp      | ) Pro<br>185 |            | Pro        | ) Ile      | e Gly      | / Glu<br>190 | ı Pro      | Pro        |
|----|---|------------|-------|------------|--------------|------------|------------|------------|------------|--------------|------------|------------|------------|------------|--------------|------------|------------|
| 5  |   | Ala        | Ala   | Pro<br>195 |              | Gly        | Val        | . Gly      | Ser<br>200 |              | Thr        | Met        | Ala        | Ser<br>205 |              | , elà      | , Gly      |
| 10 |   | Ala        | 210   |            | Ala          | <b>Asp</b> | Asp        | Asn<br>215 |            | Gly          | Ala        | . Asp      | Gly<br>220 |            | . Gly        | Asn        | . Sèr      |
| 15 |   | Ser<br>225 |       | Asn        | Trp          | His        | Cys<br>230 |            | Ser        | Thr          | Trp        | Met<br>235 |            | ' Asp      | Arg          | Val        | 11e<br>240 |
|    |   | Thr        | Thr   | Ser        | Thr          | Arg<br>245 |            | Trp        | Ala        | Leu          | Pro<br>250 | Thr        | Tyr        | Asn        | Asn          | His<br>255 |            |
| 20 |   | Tyr        | Lys   | Gln        | Ile<br>260   | Ser        | Ser        | Glu        | Ser        | Gly<br>265   | Ala        | Thr        | neA        | Asp        | Asn<br>270   | His        | Tyr        |
| 25 |   | Phe        | Gly   | Tyr<br>275 | Ser          | Thr        | Pro        | Trp        | Gly<br>280 |              | Phe        | Asp        | Phe        | Asn<br>285 | Arg          | Phe        | His        |
|    |   |            | 290   |            |              |            |            | 295        |            |              |            |            | 300        |            |              | Asn        |            |
| 30 |   | 305        |       |            |              |            | 310        |            |            |              |            | 315        |            |            |              | Gln        | 320        |
| 35 |   |            |       |            |              | 325        |            |            |            |              | 330        |            |            |            |              | Asn<br>335 |            |
|    |   |            |       |            | 340          |            |            |            |            | 345          |            |            |            |            | 350          | Pro        |            |
| 40 |   |            |       | 355        |              |            |            |            | 360        |              |            |            |            | 365        |              | Ala        |            |
| 45 |   |            | 370   |            |              |            |            | 375        |            |              |            |            | 380        |            |              | Gly        |            |
|    | , | 385        |       |            |              |            | 390        |            |            |              |            | 395        |            |            |              | Pro        | 400        |
| 50 |   |            |       |            |              | 405        |            |            |            |              | 410        |            |            |            |              | Phe<br>415 |            |
| 55 |   | Asp        | Val   |            | Phe<br>420   | HIS        | ser        | ser        | ryr        | Ala<br>425   | His        | ser        | Gln        | Ser        | Leu<br>430   | qeA        | Arg        |

| 5         | Leu         | 1 Met      | 435         |            | Leu        | ılle       | e Asp      | Glr<br>440 |            | Lev        | ту:        | Туг          | 445        |            | Lys        | Thr        | • |
|-----------|-------------|------------|-------------|------------|------------|------------|------------|------------|------------|------------|------------|--------------|------------|------------|------------|------------|---|
|           | Gln         | 450        |             | : Ser      | Gly        | Thr        | Thr<br>455 |            | Gln        | Ser        | : Arg      | 1 Leu<br>460 |            | . Phe      | SeI        | Gln        | L |
| 10        | Ala<br>465  | Gly        | Pro         | Ser        | Ser        | Met<br>470 |            | Gln        | Gln        | Ala        | Lys<br>475 |              | Trp        | Leu        | Pro        | Gly<br>480 |   |
| 15        | Pro         | Ser        | туг         | Arg        | Gln<br>485 |            | Arg        | Met        | Ser        | Lys<br>490 |            | Ala          | Asn        | Asp        | Asn<br>495 | Asn        |   |
|           | Asn         | Ser        | Glu         | Phe<br>500 | Ala        | Trp        | Thr        | Ala        | Ala<br>505 | Thr        | Lys        | Туг          | Tyr        | Leu<br>510 | Asn        | Gly        |   |
| 20        | Arg         | Asn        | Ser<br>515  | Leu        | Val        | Asn        | Pro        | Gly<br>520 | Pro        | Pro        | Met        | Ala          | Ser<br>525 | His        | Lуз        | Asp        |   |
| 25        | <b>As</b> p | Glu<br>530 | Glu         | Lys        | Tyr        | Phe        | Pro<br>535 | Met        | His        | Gly        | Asn        | Leu<br>540   | Ile        | Phe        | Gly        | Lys        |   |
|           | Gln<br>545  | Gly        | Thr         | Gly        | Thr        | Thr<br>550 | neA        | Val        | Asp        | Ile        | Glu<br>555 | Ser          | Val        | Leu        | Ile        | Thr<br>560 |   |
| 30        | Asp         | Glu        | Glu         | Glu        | 11e<br>565 | Arg        | Thr        | Thr        | Asn        | Pro<br>570 | Val        | Ala          | Thr        | Glu        | Gln<br>575 | Tyr        |   |
| 35        | Gly         | Gln        | Val         | Ala<br>580 | Thr        | Asn        | His        | Gln        | Ser<br>585 | Gln        | Asp        | Thr          | Thr        | Ala<br>590 | Ser        | Tyr        |   |
|           | Gly         | Ser        | Val<br>595  | Ąsp        | Ser        | Gln        | Gly        | Ile<br>600 | Leu        | Pro        | Gly        | Met          | Val<br>605 | Trp        | Gln        | Asp        |   |
| 40        | Arg         | Asp<br>610 | Val         | Tyr        | Leu        | Gln        | Gly<br>615 | Pro        | Ile        | Trp        | Ala        | Lys<br>620   | Thr        | Pro        | His        | Thr        |   |
| 45        | Asp<br>625  | Gly        | His         | Phe        | His        | Pro<br>630 | Ser        | Pro        | Leu        | Met        | Gly<br>635 | Gly          | Phe        | Gly        | Leu        | Lys<br>640 |   |
|           | His         | Pro        | Pro         | Pro        | Gln<br>645 | Ile        | Leu        | Ile        | Lys        | Asn<br>650 | Thr        | Pro          | Val        | Pro        | Ala<br>655 | neA        |   |
|           | Pro         | Ala        | Thr         | Thr<br>660 | Phe        | Thr        | Pro        | Gly        | Lys<br>665 | Phe        | Ala        | Ser          | Phe        | Ile<br>670 | Thr        | Gln        | ` |
| <i>55</i> | Tyr         |            | Thr,<br>675 | Gly (      | Gln        | Val        |            | Val<br>680 | Glu        | Ile        | Glu        | Trp          | Glu<br>685 | Leu        | Gln        | Lys        |   |

| 5  |                                                | Glu        | Asn<br>690 | Ser    | Lys    | Arg        | Trp        | Asn<br>695 | Pro | Glu | Ile        | Gln        | Tyr<br>700 | Thr | Ser | Asn        | Tyr        |     |
|----|------------------------------------------------|------------|------------|--------|--------|------------|------------|------------|-----|-----|------------|------------|------------|-----|-----|------------|------------|-----|
|    |                                                | Asn<br>705 | Lys        | Ser    | Val    | asA        | Val<br>710 | Glu        | Phe | Thr | Val        | Asp<br>715 | Ala        | neA | Gly | Val        | Tyr<br>720 |     |
| 10 |                                                | Ser        | Glu        | Pro    | Arg    | Pro<br>725 | Ile        | ely        | Thr | Arg | Tyr<br>730 | Leu        | Thr        | Arg | Asn | Leu<br>735 |            | •   |
| 15 | <210> 69<br><211> 735<br><212> PR<br><213> cap | Т          | otein (    | of AA\ | / sero | type, (    | clone /    | A3.5       |     |     |            |            |            |     |     |            |            |     |
| 20 | <400> 69                                       |            |            |        |        |            |            |            |     |     |            |            |            |     |     |            |            |     |
|    |                                                |            |            |        |        |            |            |            |     |     |            |            |            |     |     |            |            |     |
| 25 |                                                |            |            |        |        |            |            |            |     |     |            |            |            |     |     |            |            |     |
| 30 |                                                |            |            |        |        |            |            |            |     |     |            |            |            |     |     |            |            |     |
| 35 | ·                                              |            |            |        |        |            |            |            |     |     |            |            |            |     |     |            |            | ·   |
| 40 |                                                |            |            |        |        |            |            |            |     |     |            |            |            |     |     |            |            |     |
| 45 |                                                |            |            |        |        |            |            |            |     |     |            |            |            |     |     |            |            | ₹ - |
| 50 | ·                                              |            |            |        |        |            |            |            |     |     |            |            |            |     |     |            |            |     |

|           | Met<br>1   | : Ala      | Ala        | qe <i>A</i> | G1y<br>5   | Tyr        | Lev        | . Pro      | qe <i>A</i> | Trp<br>10  | Leu        | Glu        | Asp        | Thr        | Leu<br>15  | Ser        |
|-----------|------------|------------|------------|-------------|------------|------------|------------|------------|-------------|------------|------------|------------|------------|------------|------------|------------|
| 5         | Glu        | Gly        | Ile        | Arg<br>20   | Gln        | Trp        | Trp        | Lys        | Leu<br>25   | Lys        | Pro        | Gly        | Pro        | Pro<br>30  | Pro        | Pro        |
| 10        | Lys        | Pro        | Asn<br>35  | Gln         | Gln        | His        | Arg<br>'   | Asp<br>40  | Asp         | Ser        | Arg        | Gly        | Leu<br>45  | Val        | Leu        | Pro        |
|           | ely        | Tyr<br>50  | Lys        | Tyr         | Leu        | Gly        | Pro<br>55  | Phe        | Asn         | Gly        | Leu        | Asp<br>60  | Lys        | Gly        | Glu        | Pro        |
| 15        | Val<br>65  | Asn        | Glu        | Ala         | Asp        | Ala<br>70  | Ala        | Ala        | Leu         | Glu        | His<br>75  | Ąsp        | Lys        | Ala        | Tyr        | Asp<br>08  |
| 20        | His        | Gln        | Leu        | Lys         | Gln<br>85  | Gly        | Asp        | Asn        | Pro         | Tyr<br>90  | Leu        | Lys        | Tyr        | neA        | His<br>95  | Ala        |
| ,         | Asp        | Ala        | Glu        | Phe<br>100  | Gln        | Glu        | Arg        | Leu        | Gln<br>105  | Glu        | Asp        | Thr        | Ser        | Phe<br>110 | Gly        | Gly        |
| 25        | Asn        | Leu        | Gly<br>115 | Arg         | Ala        | Val        | Phe        | Gln<br>120 | Ala         | Lys        | Lys        | Arg        | Val<br>125 | Leu        | Glu        | Pro        |
| <b>30</b> | Leu        | Gly<br>130 | Leu        | Val         | Glu        | Glu        | Ala<br>135 | Val        | Lys         | Thr        | Ala        | Pro<br>140 | Gly        | Lys        | Lya        | Arg        |
|           | Pro<br>145 | Ile        | Glu        | Gln         | Ser        | Pro<br>150 | Ala        | Glu        | Pro         | Asp        | Ser<br>155 | Ser        | Ser        | Gly        | Ile        | Gly<br>160 |
| 35        | Lys        | Ser        | Gly        | Gln         | Gln<br>165 | Pro        | Ala        | Lys        | Lys         | Arg<br>170 | Leu        | Asn        | Phe        | Gly        | Gln<br>175 | Thr        |
| 40        | Gly        | Asp        | Thr        | Glu<br>180  | Ser        | Val        | Pro        | Asp        | Pro<br>185  | Gln        | Pro        | Ile        | Gly        | Glu<br>190 | Pro        | Pro        |
|           |            |            |            |             |            |            |            |            |             |            |            |            |            |            |            |            |

|      |   | Ala        | a Ala      | 19:        | Se:        | r Gl       | y Val      | l Gly      | y Se:<br>200 |            | n Th       | r Me         | t Al       | a Se.<br>20: |            | y Gl         | y Gl         |
|------|---|------------|------------|------------|------------|------------|------------|------------|--------------|------------|------------|--------------|------------|--------------|------------|--------------|--------------|
| 5    |   | Ala        | 210        | Met        | : Ala      | a As       | p Asr      | 215        |              | ı Gl       | y Al       | a Ası        | G1:        |              | 1 G1;      | y Ası        | n Ser        |
| 10   |   | Se:<br>225 | c Gly      | / Asr      | Trp        | Hi:        | 230        |            | ) Ser        | Thi        | r Tr       | 9 Met<br>235 |            | ieA y        | Ar         | g Vai        | l Ile<br>240 |
|      |   | Thi        | Thr        | · Ser      | Thr        | 245        |            | Trp        | Ala          | Lev        | 250        |              | ту1        | c Asr        | a Ası      | n His<br>255 | . Leu        |
| 15 · |   | Tyr        | : Lys      | Gln        | 1le<br>260 | Sez        | Ser        | Glu        | Ser          | Gly<br>265 |            | Thr          | 'Asr       | Asp          | 270        |              | Tyr          |
| 20   |   | Phe        | Gly        | Tyr<br>275 | Ser        | Thr        | Pro        | Trp        | Gly<br>280   |            | Phe        | a Asp        | Phe        | Aen<br>285   |            | Phe          | His          |
|      |   | Суз        | His<br>290 | Phe        | Ser        | Pro        | Arg        | Asp<br>295 |              | Gln        | Arg        | Leu          | Ile<br>300 |              | Asn        | Asn          | Trp          |
| 25   |   | Gly<br>305 | Phe        | Arg        | Pro        | Lys        | Lys<br>310 | Leu        | Asn          | Phe        | Lys        | Leu<br>315   | Phe        | Asn          | Ile        | Gln          | Val<br>320   |
| 30   |   | Lys        | Glu        | Val        | Thr        | Gln<br>325 | Asn        | Asp        | GŢĀ          | Thr        | Thr<br>330 | Thr          | Ile        | Ala          | Asn        | Asn<br>335   | Leu          |
|      |   | Thr        | Ser        | Thr        | Val<br>340 | Gln        | Val        | Phe        | Thr          | Азр<br>345 | Ser        | Glu          | Tyr        | Gln          | Leu<br>350 | Pro          | Tyr          |
| 35   |   | Val        | Leu        | Gly<br>355 | Ser        | Ala        | His        | Gln        | 360          | Сув        | Leu        | Pro          | Pro        | Phe<br>365   | Pro        | Ala          | Asp          |
| 40   |   | Val        | Phe<br>370 | Met        | Ile        | Pro        | Gln        | Tyr<br>375 | Gly          | Tyr        | Leu        | Thr          | 380        | Asn          | neA        | Gly          | Ser          |
|      |   | Gln<br>385 | Ala        | Val        | Gly        | Arg        | Ser<br>390 | Ser        | Phe          | Tyr        | Cys        | Leu<br>395   | Glu        | Tyr          | Phe        | Pro          | Ser<br>400   |
| 45   |   | Gln        | Met        | Leu        | Arg        | Thr<br>405 | Gly        | neA        | Asn          | Phe        | Thr<br>410 | Phe          | Ser        | Tyr          | Thr        | Phe<br>415   | Glu          |
| 50   |   | Asp ·      | Val        | Pro        | Phe<br>420 | His        | Ser        | Ser        |              | Ala<br>425 | His        | Ser          | Gln        | Ser          | Leu<br>430 | Asp          | Arg          |
|      | ı | Leu        | Met        | Asn<br>435 | Pro        | Leu        | Ile .      | Asp        | Gln 440      | Tyr        | Leu        | Tyr          | Tyr        | Leu<br>445   | Ser        | Lys          | Thr          |
| 55   |   |            |            |            |            |            |            |            |              |            |            |              |            |              |            |              |              |

|    | G]         | .n Gl<br>45 | y Th         | ır Se      | er G       | ly Tì      | nr Tì<br>45 | r G)<br>55 | .n G       | ln Se       | r Ar       | g Le<br>46          |            | n Pl       | ne As      | sn Gl              |
|----|------------|-------------|--------------|------------|------------|------------|-------------|------------|------------|-------------|------------|---------------------|------------|------------|------------|--------------------|
| 5  | A1<br>46   | a Gl<br>5   | y Pr         | o Se       | er Se      | er Me      | et Al       | a Gl       | n Gl       | ın Al       | a Ly:      | <b>s A.s</b> :<br>5 | n Tr       | p Le       | eu Pr      | :0 Gl <sub>3</sub> |
| 10 | Pr         | o Se        | г Ту         | r Ar       | g Gl<br>48 | n G1       | n Ar        | g Me       | t Se       | r Ly.<br>49 | s Thi      | r Ale               | a As       | n As       | p As<br>49 | n Asn<br>5         |
|    | As         | n Se.       | r Gl         | u Ph<br>50 | e Al<br>0  | a Tr       | p Th        | r Al       | a Al<br>50 | a Thi       | r Lys      | ту:                 | r Ty       | r Pr<br>51 |            | n Gly              |
| 15 | Ar         | g Ası       | n Se:<br>515 | r Le       | u Va       | l As       | n Pr        | 520        | y Pr       | o Pro       | Met        | : Ala               | Se:        | Hi:        | s Ly       | s Asp              |
| 20 | qe.A       | 530         | ı Glı        | Ly:        | з Ту       | r Phe      | 9 Pro       | Met<br>S   | : His      | s Gly       | ' Asn      | Leu<br>540          | Ile        | Phe        | e Gly      | , Lys              |
|    | Glr<br>545 | Gly         | Thr          | : Gly      | Thi        | Th:<br>550 | c Asr       | Val        | Asp        | Ile         | Glu<br>555 | Ser                 | Val        | Let        | ılle       | Thr<br>560         |
| 25 | Asp        | Glu         | Glu          | Glu        | Ile<br>565 | a Arg      | J Thr       | Thr        | Asn        | Pro<br>570  | Val        | Ala                 | Thr        | Glu        | Gln<br>575 | Tyr                |
| 30 | Gly        | Gln         | ·Val         | Ala<br>580 | Thr        | Asn        | Arg         | Gln        | Ser<br>585 | Gln         | neA        | Thr                 | Thr        | Ala<br>590 |            | Tyr                |
|    | Gly        | Ser         | Val<br>595   | Asp        | Ser        | Gln        | Gly         | Ile<br>600 | Leu        | Pro         | GĮУ        | Met                 | Val<br>605 | Trp        | Gln        | Asp                |
| 35 | Arg        | Asp<br>610  | Val          | Tyr        | Leu        | Gln        | Gly<br>615  | Pro        | Ile        | Trp         | Ala        | Lys<br>620          | Thr        | Pro        | His        | Thr                |
| 40 | Asp<br>625 | ΘΊУ         | His          | Phe        | His        | Pro<br>630 | Ser         | Pro        | Leu        | Met         | Gly<br>635 | Gly                 | Phe        | Gly        | Leu        | Lys<br>640         |
|    | His        | Pro         | Pro          | Pro        | Gln<br>645 | Ile        | Leu         | Ile        | Lys        | Asn<br>650  | Thr        | Pro                 | Val        | Pro        | Ala<br>655 | Asn                |
| 45 | Pro        |             | Thr          | Thr<br>660 | Phe        | Thr        | Pro         | Gly        | Lys<br>665 | Phe .       | Ala        | Ser                 | Phe        | Ile<br>670 | Thr        | Gln                |
| 50 | Tyr        |             |              | Gly        | Gln        | Val        | Ser         | Val<br>680 | Glu        | Ile         | Glu '      |                     | Glu<br>685 | Leu .      | Gln        | Lys                |
|    | Glu .      | Asn<br>690  | Ser          | Lys        | Arg        | Trp        | Asn<br>695  | Pro        | Glu        | Ile (       | Sln ?      | Tyr 1               | Thr :      | Ser        | Asn        | Tyr                |
| 55 |            |             |              |            |            |            |             |            |            |             |            |                     |            |            |            |                    |

|      | •                                             | Asn<br>705 | Lys        | Ser        | Val        | Asn             | Val<br>710 |            | Phe        | Thr        | · Val      | 715        |            | . Asn      | Gly        | Val        | Tyr<br>720 |
|------|-----------------------------------------------|------------|------------|------------|------------|-----------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| 5    |                                               | Ser        | Glu        | Pro        | Arg        | Pro<br>725      |            | Gly        | Thr        | Arg        | Tyr<br>730 |            | Thr        | Arg        | neA        | Leu<br>735 |            |
| 10   | <210> 70<br><211> 73<br><212> PR<br><213> cap | T          | otein      | of AA'     | V serc     | otype,          | clone      | AAV2       |            |            |            |            |            |            |            |            | `          |
| 15   | <400> 70                                      |            |            |            | ٠          |                 |            |            |            |            |            |            |            |            | •          |            |            |
|      |                                               | Met<br>1   | Ala        | Ala        | Asp        | <b>Gly</b><br>5 | Tyr        | Leu        | Pro        | Asp        | Trp<br>10  | Leu        | Glu        | Asp        | Thr        | Leu<br>15  | Ser        |
| 20   |                                               | Glu        | СΊΥ        | Ile        | Arg<br>20  | Gln             | Trp        | Trp        | Lys        | Leu<br>25  | Lys        | Pro        | GJA        | Pro        | Pro<br>30  | Pro        | Pro        |
| - 25 |                                               | Lys        | Pro        | Ala<br>35  | Glu        | Arg             | His        | Lys        | Asp<br>40  | Asp        | Ser        | Arg        | Gly        | Leu<br>45  | Val        | Leu        | Pro        |
|      |                                               | Gly        | Tyr<br>50  | Lys        | Tyr        | Leu             | Gly        | Pro<br>55  | Phe        | Asn        | Gly        | Leu        | Asp<br>60  | Lys        | elà        | Glu        | Pro        |
| 30   |                                               | Val<br>65  | Asn        | Glu        | Ala        | qeA             | Ala<br>70  | Ala        | Ala        | Leu        | Glu        | His<br>75  | Asp        | Lys        | Ala        | Tyr        | Asp<br>80  |
| 35   |                                               | Arg        | Gln        | Leu        | Asp        | Ser<br>85       | Gly        | Asp        | Asn        | Pro        | Tyr<br>90  | Leu        | Lys        | Tyr        | Asn        | His<br>95  | Ala        |
|      |                                               | Asp        | Ala        | Glu        | Phe<br>100 | Gln .           | Glu        | Arg        | Leu        | Lys<br>105 | Glu        | dsY        | Thr        | Ser        | Phe<br>110 | GJA        | Gly        |
| 40   |                                               | Asn        | Leu        | Gly<br>115 | Arg        | Ala             | Val        | Phe        | Gln<br>120 | Ala        | Lys        | Lys        | Arg        | Val<br>125 | Leu        | Glu        | Pro        |
| 45   |                                               |            | Gly<br>130 | Гел        | Val        | Glu             | Glu        | Pro<br>135 | Val        | Lys        | Thr        | Ala        | Pro<br>140 | Gly        | Lys        | Lys        | Arg        |
| 50   |                                               | Pro<br>145 | Val        | Glu        | His        | Ser             | Pro<br>150 | Val        | Glu        | Pro        | Asp        | ser<br>155 | Ser        | Ser        | Gly        | Thr        | Gly<br>160 |
| 50   |                                               | Lys        | Ala        | Gly        |            | Gln<br>165      | Pro        | Ala        | Arg        | Lys        | Arg<br>170 | Leu        | Asn        | Phe        | Gly        | Gln<br>175 | Thr        |
| 55   |                                               | Gly .      | Asp .      |            | Asp<br>180 | Ser             | Val        | Pro        |            | Pro<br>185 | Gln        | Pro        | Leu        | Gly        | Gln<br>190 | Pro        | Pro        |

|           | Ala        | a Ala      | Pro<br>195 |            | : Gly      | Lev        | Gly        | Thr<br>200 |            | Thi        | Met        | : Ala      | 205        |            | Ser        | Gly        |
|-----------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| 5         | Ala        | 210        |            | : Ala      | Asp        | Asn        | Asn<br>215 |            | Gly        | Ala        | qeA ı      | Gly<br>220 |            | Gly        | ' Asn      | Ser        |
| 10        | Ser<br>225 |            | ' Asn      | Trp        | His        | Cys<br>230 |            | Ser        | Thr        | Trp        | Met<br>235 |            | Asp        | Arg        | Val        | Ile<br>240 |
| 15        | Thr        | Thr        | Ser        | Thr        | Arg<br>245 |            | Trp        | Ala        | Leu        | Pro<br>250 |            | Tyr        | Asn        | Asn        | His<br>255 | Leu        |
| 15        | Tyr        | Lys        | Gln        | Ile<br>260 |            | Ser        | Gln        | Ser        | Gly<br>265 |            | Ser        | Asn        | Asp        | Asn<br>270 | His        | Tyr        |
| 20        | Phe        | Gly        | Tyr<br>275 |            | Thr        | Pro        | Trp        | Gly<br>280 | Tyr        | Phe        | Asp        | Phe        | Asn<br>285 | •          | Phe        | His        |
| 25        | Суз        | His<br>290 |            | Ser        | Pro        | Arg        | Asp<br>295 | Trp        | Gln        | Arg        | Leu        | Ile<br>300 | Asn        | neA        | neA        | Trp        |
|           | Gly<br>305 |            | Arg        | Pro        | Lys        | Arg<br>310 | Leu        | Asn        | Phe        | Lys        | Leu<br>315 | Phe        | neA        | Ile        | Gln        | Val<br>320 |
| 30        | Lys        | Glu        | Val        | Thr        | Gln<br>325 | Asn        | Asp        | Gly        | Thr        | Thr<br>330 | Thr        | Ile        | Ala        | Asn        | Asn<br>335 | Leu        |
| <i>35</i> | Thr        | Ser        | Thr        | Val<br>340 | Gln        | Val        | Phe        | Thr        | Asp<br>345 | Ser        | Glu        | Tyr        | Gln        | Leu<br>350 | Pro        | Tyr        |
|           | Val        | Leu        | Gly<br>355 | Ser        | Ala        | His        | Gln        | Gly<br>360 | Суз        | Leu        | Pro        | Pro        | Phe<br>365 | Pro        | Ala        | Asp        |
| 40        | Val        | Phe<br>370 | Met        | Val        | Pro        | Gln        | Tyr<br>375 | Gly        | Tyr        | Leu        | Thr        | Leu<br>380 | Asn        | Asn        | Gly        | Ser        |
| 45        | Gln<br>385 | Ala        | Val        | Gly        | Arg        | Ser<br>390 | Ser        | Phe        | Tyr        | Cys        | Leu<br>395 | Glu        | Tyr        | Phe        | Pro        | Ser<br>400 |
|           | Gln        | Met        | Leu        | Arg        | Thr<br>405 | Gly        | Asn        | Asn        | Phe        | Thr<br>410 | Phe        | Ser        | Tyr        | Thr        | Phe<br>415 | Glu        |
| 50        | qeA        | Val        | Pro        | Phe<br>420 | His        | Ser        | Ser        | Tyr        | Ala<br>425 | His        | Ser        | Gln        | Ser        | Leu<br>430 | Asp        | Arg        |
| 55        | Leu        | Met        | Asn<br>435 | Pro        | Leu        | Ile        | qeA        | Gln<br>440 | Tyr        | Leu        | Tyr        | Tyr        | Leu<br>445 | Ser        | Arg        | Thr        |

| 5  | Ası        | 450        |             | Sei        | Gly        | / Thi      | 455        |            | r Gli        | n Se:      | r Ar       | 4 6 (      |              | n Ph       | e Se       | r Glm      |
|----|------------|------------|-------------|------------|------------|------------|------------|------------|--------------|------------|------------|------------|--------------|------------|------------|------------|
| J  | Ala<br>465 | a Gly      | / Ala       | s Ser      | reA        | 470        |            |            | p Glr        | n Sei      | 475        |            | Tr           | o Lei      | ı Pro      | 61y<br>480 |
| 10 | Pro        | Cys        | туг         | : Arg      | Gln<br>485 |            | Arg        | y Val      | l Ser        | 190        |            | `Sez       | Ala          | a Ası      | Asr<br>495 | Asn        |
| 15 | Asn        | Sez        | Glu         | Tyr<br>500 | Ser        | Trp        | Thr        | Gly        | / Ala<br>505 |            | : Lys      | Tyr        | His          | 510        |            | Gly        |
|    | Arg        | Asp        | Ser<br>\$15 | Leu        | Val        | Asn        | Pro        | Gly<br>520 |              | Ala        | Met        | Ala        | . Ser<br>525 |            | Lys        | Asp        |
| 20 | Asp        | 61u<br>530 | Glu         | Lys        | Phe        | Phe        | Pro<br>535 |            | Ser          | Gly        | Val        | Leu<br>540 |              | Phe        | : Gly      | Lys        |
| 25 | Gln<br>545 | Gly        | Ser         | Glu        | Lys        | Thr<br>550 |            | Val        | Asp          | Ile        | Glu<br>555 | Ìуз        | Val          | Met        | Ile        | Thr<br>560 |
|    | Asp        | Glu        | Glu         | Glu        | Ile<br>565 | Arg        | Thr        | Thr        | Asn          | Pro<br>570 | Val        | Ala        | Thr          | Glu        | Gln<br>575 | Tyr        |
| 30 | Gly        | Ser        | Val         | Ser<br>580 | Thr        | Asn        | Leu        | Gln        | Arg<br>585   | Gly        | Asn        | Arg        | Gln          | Ala<br>590 | Ala        | Thr        |
| 35 | Ala        | Asp        | Val<br>595  | Asn        | Thr        | Gln        | Gly        | Val<br>600 | Leu          | Pro        | ely        | Met        | Val<br>605   | Trp        | Gln        | Asp        |
|    | Arg        | Asp<br>610 | Val         | Tyr        | Leu        | Gln        | Gly<br>615 | Pro        | Ile          | Trp        | Ala        | Lys<br>620 | Ile          | Pro        | His        | Thr        |
| 40 | Asp<br>625 | Gly        | His         | Phe        | His        | Pro<br>630 | Ser        | Pro        | Leu          | Met        | Gly<br>635 | Gly        | Phe          | Gly        | Leu        | Lys<br>640 |
| 45 | His        | Pro        | Pro         | Pro        | Gln<br>645 | Ile        | Leu        | Ile        | Ľуз          | Asn<br>650 | Thr        | Pro        | Val          | Pro        | Ala<br>655 | Asn        |
|    | Pro        | Ser        | Thr         | Thr<br>660 | Phe        | Ser        | Ala        | Ala        | Lys<br>665   | Phe        | Ala        | Ser        | Phe          | Ile<br>670 | Thr        | Gln        |
| 50 | Tyr        | Ser        | Thr<br>675  | Gly        | Gln        | Val        | Ser        | Val<br>680 | Glu          | Ile        | Glu        | Trp        | Glu<br>685   | Leu        | Gln        | Lya        |
| 55 | Glu        | Asn<br>690 | Ser         | Lys        | Arg        | Trp        | Asn<br>695 | Pro        | ΘĴп          | Ile        |            | Tyr<br>700 | Thr          | Ser        | Asn        | Tyr        |

|    |                                  |            |       |         |        |            |            |        |            |     |            |            |     |     | •    |            |            |
|----|----------------------------------|------------|-------|---------|--------|------------|------------|--------|------------|-----|------------|------------|-----|-----|------|------------|------------|
|    |                                  | Asn<br>705 | Lys   | Ser     | Val    | Asn        | Val<br>710 | Asp    | Phe        | Thr | Val        | Asp<br>715 | Thr | neA | elă, | Val        | Tyr<br>720 |
| 5  |                                  | Ser        | Glu   | Pro     | Arg    | Pro<br>725 | Ile        | ely    | Thr        | Arg | Tyr<br>730 | Leu        | Thr | Arg | Asn  | Leu<br>735 |            |
| 10 | <210><br><211><br><212><br><213> | 736<br>PRT | prote | in of A | AAV se | erotyp     | e, clor    | ne AA' | <b>V</b> 3 |     |            |            |     |     |      |            |            |
| 15 | <400>                            | 71         |       |         |        | •          |            |        |            |     |            |            |     |     |      |            |            |
| 20 |                                  |            |       |         |        |            |            |        |            |     |            |            |     |     |      |            |            |
| 25 |                                  |            |       |         |        |            |            |        |            |     |            |            |     |     |      |            |            |
| 30 |                                  |            |       |         |        |            |            |        |            |     |            |            |     |     |      |            |            |

|    | Met<br>1   | Ale        | Ala        | Asp        | Gly<br>5   | Туг        | Leu        | Pro        | Asp        | Trp<br>10  | Lev        | Glu        | Asp        | nek o      | Leu<br>15  | Ser        |
|----|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| 5  | Glu        | Gly        | Ile        | Arg<br>20  | Glu        | Trp        | Trp        | Ala        | Leu<br>25  | Lys        | Pro        | Gly        | Val        | Pro<br>30  | Gln        | Pro        |
| 10 | Lys        | Ala        | Asn<br>35  | Gln        | Gln        | His        |            | Asp<br>40  | Asn        | Arg        | Arg        | Gly        | Leu<br>45  | Val        | Leu        | Pro        |
|    | Gly        | Tyr<br>50  | Lys        | Tyr        | Leu        | Gly        | Pro<br>55  | Gly        | Asn        | Gly        | Leu        | qeA<br>00  | Lys        | Gly        | Glu        | Pro        |
| 15 | Val<br>65  | Asn        | Glu        | Ala        | Asp        | Ala<br>70  | Ala        | Ala        | Leu        | Glu        | His<br>75  | Asp        | Lys        | Ala        | Tyr        | Asp<br>80  |
| 20 | Gln        | Gln        | Leu        | Lys        | Ala<br>85  | Gly        | Asp        | Asn        | Pro        | Туг<br>90  | Leu        | Lys        | Tyr        | neA        | His<br>95  | Ala        |
|    | Asp        | Ala        | Glu        | Phe<br>100 | Gln        | Glu        | Arg        | Leu        | Gln<br>105 | Glu        | Asp        | Thr        | Ser        | Phe<br>110 | Gly        | Gly        |
| 25 | neA        | Leu        | Gly<br>115 | Arg        | Ala        | Val        | Phe        | Gln<br>120 | Ala        | Lys        | Lys        | Arg        | Ile<br>125 | Leu        | Glu        | Pro        |
| 30 | Leu        | Gly<br>130 | Leu        | Val        | Glu        | Glu        | Ala<br>135 | Ala        | Lys        | Thr        | Ala        | Pro<br>140 | Gly        | Lys        | Lys        | Gly        |
|    | Ala<br>145 | Val        | qeA        | Gln        | Ser        | Pro<br>150 | Gln        | Glu        | Pro        | qeA        | Ser<br>155 | Ser        | Ser        | Gly        | Val        | Gly<br>160 |
| 35 | Lys        | Ser        | Gly        | Lys        | Gln<br>165 | Pro        | Ala        | Arg        | ŗ          | Arg<br>170 | Leu        | Asn        | Phe        | Gly        | Gln<br>175 | Thr        |
| 40 | Gly        | Asp        |            | Glu<br>180 | Ser        | Val        | Pro        |            | Pro<br>185 | Gln        | Pro        | Leu        | Gly        | Glu<br>190 | Pro        | Pro        |
|    | Ala        | Ala        | Pro<br>195 | Thr        | Ser        | Leu        |            | Ser<br>200 | Asn        | Thr        | Met        |            | Ser<br>205 | Gly        | Gly        | Gly        |
| 45 |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |

| 5  |   | Al         | a Pro<br>210       |            | : Ala      | Asp        | a Ası      | 215        |            | ı Gly      | / Ala      | Asp        | 220          |            | . Gly        | / Ası      | n Ser        |
|----|---|------------|--------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|--------------|------------|--------------|------------|--------------|
|    |   | Se:        |                    | / AST      | Trp        | His        | 230        |            | Sei        | : Glr      | Trp        | 235        |              | ' Asp      | Arg          | Val        | . Ile<br>240 |
| 10 |   | Th         | r <sup>`</sup> Thr | Ser        | Thr        | Arg<br>245 |            | Trp        | Ala        | . Lev      | 250        |            | Tyr          | Asn        | . Asr        | His<br>255 | Leu          |
| 15 |   | Ty         | : Lys              | Gln        | 11e<br>260 | Ser        | Ser        | Gln        | Ser        | Gly<br>265 | Ala        | Ser        | Asn          | qeA        | Asn<br>270   |            | Tyr          |
|    |   | Phe        | : Gly              | Tyr<br>275 |            | Thr        | Pro        | Trp        | Gly<br>280 |            | Phe        | Asp        | Phe          | Asn<br>285 |              | Phe        | His          |
| 20 |   | Суз        | His<br>290         | Phe        | Ser        | Pro        | Arg        | Asp<br>295 | Trp        | Gln        | Arg        | Leu        | Ile<br>300   | Asn        | Asn          | Asn        | Trp          |
| 25 |   | Gly<br>305 | Phe                | Arg        | Pro        | Lys        | Lys<br>310 | Leu        | Ser        | Phe        | Lys        | Leu<br>315 | Phe          | Asn        | Ile          | Gln        | Val<br>320   |
|    |   | Arg        | Gly                | Val        | Thr        | Gln<br>325 | Asn        | Asp        | Gly        | Thr        | Thr<br>330 | Thr        | Ile          | Ala        | Asn          | Asn<br>335 | Leu          |
| 30 |   | Thr        | Ser                | Thr        | Val<br>340 | Gln        | Val        | Phe        | Thr        | Asp<br>345 | Ser.       | Glu        | Tyr          | Gln        | Leu<br>350   | Pro        | Tyr          |
| 35 |   | Val        | Leu                | Gly<br>355 | Ser        | Ala        | His        | Gln        | Gly<br>360 | Суз        | Leu        | Pro        | Pro          | Phe<br>365 | Pro          | Ala        | Asp          |
|    |   | Val        | Phe<br>370         | Met        | Val        | Pro        | Gln        | Tyr<br>375 | Gly        | Tyr        | Leu        | Thr        | Leu<br>380   | Asn        | Asn          | Glý        | Ser          |
| 40 |   | Gln<br>385 | Ala                | Val        | Gly        | Arg        | Ser<br>390 | Ser        | Phe        | Tyr        | Cys        | Leu<br>395 | Glu          | Tyr        | Phe          | Pro        | ser<br>400   |
| 45 |   | Gln        | Met                | Leu        | Arg        | Thr<br>405 | Gly        | Asn        | Asn        | Phe        | Gln<br>410 | Phe        | Ser<br>      | Tyr        | Thr          | Phe<br>415 | Glu          |
|    |   | ģεΑ        | Val                | Pro        | Phe<br>420 | His        | Ser        | Ser        | Tyr        | Ala<br>425 | His        | Ser        | Gln          | Ser        | Leu .<br>430 | Asp        | Arg          |
| 50 | ÷ | Leu        | Met                | Asn<br>435 | Pro        | Leu        | Ile        |            | Gln<br>440 | Tyr        | Leu        | Tyr        |              | Leu<br>445 | Asn .        | Arg        | Thr          |
| 55 |   | Gln        | Gly<br>450         | Thr        | Thr        | Ser        |            | Thr '      | Thr        | Asn        | Gln .      |            | Arg :<br>460 | Leu        | Leu          | Phe        | Ser          |

| 5  |   | 46.        | 5          | - 0-,      | ,          | <b>J J L</b> | 470        |                     |            | . 50       | . 01.             | 47         |            | g AJ       |            | p 20.        | 480        |
|----|---|------------|------------|------------|------------|--------------|------------|---------------------|------------|------------|-------------------|------------|------------|------------|------------|--------------|------------|
|    |   | Gl         | y Pro      | Cys        | з Туг      | Ar<br>48     |            | Glr                 | Arg        | J Let      | 1 Se<br>490       |            | Th:        | r Ala      | a Ası      | n Asp<br>495 |            |
| 10 |   | RS         | a Asr      | sez        | 500        |              | e Pro      | Tr                  | The        | 505        |                   | a Sez      | Lys        | з Туг      | His<br>510 |              |            |
| 15 | - | Сĵ         | / Arg      | Asp<br>515 | Ser        | Lev          | Val        | . Asn               | 9ro<br>520 |            | Pro               | Ala        | Met        | Ala<br>525 |            | His          | Lys        |
|    |   | Asp        | 330<br>530 |            | Glu        | Lys          | Phe        | Phe<br>535          |            | Met        | His               | Gly        | Asn<br>540 |            | Ile        | Phe          | Gly        |
| 20 |   | Lys<br>545 | Glu        | Gly        | Thr        | Thr          | Ala<br>550 |                     | Asn        | Ala        | Glu               | Leu<br>555 |            | Asn        | Val        | Met          | Ile<br>560 |
| 25 |   | Thr        | qeA        | Glu        | Glu        | G1u<br>565   |            | Arg                 | Thr        | Thr        | <b>Asn</b><br>570 |            | Val        | Ala        | Thr        | Glu<br>575   |            |
|    |   | Tyr        | Gly        | Thr        | Val<br>580 | Ala          | Asn        | Asn                 | Leu        | Gln<br>585 | Ser               | Ser        | Asn        | Thr        | Ala<br>590 |              | Thr        |
| 30 |   | Thr        | Gly        | Thr<br>595 | Val        | Asn          | His        | Gln                 | Gly<br>600 | Ala        | Leu               | Pro        | Gly        | Met<br>605 | Val        | Trp          | Gln        |
| 35 |   | Asp        | Arg<br>610 | Asp        | Val        | Tyr          | Leu        | Gln<br>615          | Gly        | Pro        | Ile               | Trp        | Ala<br>620 | Lys        | Ile        | Pro          | His        |
|    |   | Thr<br>625 | qeA        | Gly        | His        | Phe          | His<br>630 | Pro                 | Ser        | Pro        | Leu               | Met<br>635 | Сĵλ        | Gly        | Phe        | ely          | Leu<br>640 |
| 40 |   | Lys        | His        | Pro        | Pro        | Pro<br>645   | Gln        | Ile                 | Met        | Ile        | Lys<br>650        | Asn        | Thr        | Pro        | Val        | Pro<br>655   | Ala        |
| 45 |   | Asn        | Pro        | Pro        | Thr<br>660 | Thr          | Phe        | Ser                 | Pro        |            |                   | Phe        |            |            | Phe<br>670 | Ile          | Thr        |
|    |   | Gln        | Tyr        | Ser<br>675 | Thr        | Gly          | Gln        | Val                 | Ser<br>680 | Val        | Glu               | Ile        | Glu        | Trp<br>685 | Glu        | Leu          | Gln        |
| 50 |   | Lys        | Glu<br>690 | Asn        | Ser        | Lys          |            | Trp<br>6 <b>9</b> 5 | Asn        | Pro        | Glu               |            | Gln<br>700 | Tyr        | Thr        | Ser          | Asn        |
| 55 |   | Tyr<br>705 | Asn        | Lys        | Ser        | Val          | Asn<br>710 | Val                 | Asp        | Phe        |                   | Val<br>715 | qeA        | Thr        | Asn        | Gly          | Val<br>720 |

Tyr Ser Glu Pro Arg Pro Ile Gly Thr Arg Tyr Leu Thr Arg Asn Leu 725 730 735

|    | <210> 1<br><211> 1<br><212> 1<br><213> 0 | 737<br>PRT       | prote      | in of A    | AV.se      | erotvo     | e. clor    | ne 3.3l    | bVP1       |            |            |            |            |            |            |            |            |
|----|------------------------------------------|------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| 10 | <400>                                    |                  |            |            | ,          |            | -,         |            |            |            |            |            |            |            |            |            |            |
| 15 |                                          | Met<br>1         | Ala        | Ala        | Asp        | . Gly<br>5 | Tyr        | Leu        | Pro        | Asp        | Trp<br>10  | Leu        | Glu        | <b>Asp</b> | Asn        | Leu<br>15  | Ser        |
| 20 |                                          | Glu              | Gly        | Ile        | Arg<br>20  | Glu        | Trp        | Trp        | qeA        | Leu<br>25  | Lys        | Pro        | Gly        | Ala        | Pro<br>30  | Lys        | Pro        |
|    |                                          | Lys              | Ala        | Asn<br>35  | Gln        | Gln        | Lys        | Gln        | Asp<br>40  | Asn        | Gly        | Arg        | Gly        | Leu<br>45  | Val        | Leu        | Pro        |
| 25 |                                          | Gly              | Туr<br>50  | Lys        | Tyr        | Leu        | ely        | Pro<br>55  | Phe        | Asn        | Gly        | Leu        | Asp<br>60  | Lys        | Gly        | Glu        | Pro        |
| 30 |                                          | <b>Val</b><br>65 | neA        | Ala        | Ala        | Asp        | Ala<br>70  | Ala        | Ala        | Leu        | Glu        | His<br>75  | Asp        | Lys        | Ala        | Tyr        | Asp<br>80  |
|    |                                          | Gln              | Gln        | Leu        | neA        | Ala<br>85  | Gly        | Asp        | Asn        | Pro        | Tyr<br>90  | Leu        | Arg        | Tyr        | Asn        | His<br>95  | Ala        |
| 35 |                                          | qeA              | Ala        | Glu        | Phe<br>100 | Gln        | Glu        | Arg        | Leu        | Gln<br>105 | Glu        | Asp        | Thr        | Ser        | Phe<br>110 | Gly        | Gly        |
| 40 |                                          | Asn              | Leu        | Gly<br>115 | Arg        | Ala        | Val        | Phe        | Gln<br>120 | Ala        | Lys        | Lys        | Arg        | Val<br>125 | Leu        | Glu        | Pro.       |
|    | -                                        | Leu              | Gly<br>130 | Leu        | Val        | Glu        | Glu        | Gly<br>135 | Ala        | Lys        | Thr        | Ala        | Pro<br>140 | Ala        | Lys        | Lys        | Arg        |
| 45 |                                          | Pro<br>145       | Val        | Glu        | Pro        | Ser        | Pro<br>150 | Gln        | Arg        | Ser        | Pro        | Asp<br>155 | Ser        | Ser        | Thr        | Gly        | Ile<br>160 |
| 50 |                                          | Gly              | Lys        | Lys        | Gly        | Gln<br>165 | Gln        | Pro        | Ala        | .Arg       | Lys<br>170 | Arg        | Leu        | Asn        | Phe        | Gly<br>175 | Gln        |
|    |                                          | Thr              | Gly        | qeA        | ser<br>180 | Glu        | Ser        | Val        | Pro        | Asp<br>185 | Pro        | Gln        | Pro        | Leu        | Gly<br>190 | Glu        | Pro        |
| 55 |                                          | Pro              | Ala        | Ala<br>195 | Pro        | Ser        | Ser        | Val        | Gly<br>200 | Ser        | Gly        | Thr        | Val        | Ala<br>205 | Ala        | еĵà        | Gly        |

|      |   | Gly        | y Ala<br>210 | a Pro      | ) Met      | E Als      | y Yai      | 215        |                 | a Gl       | u Gly        | Ala        | 220        |            | y Vai      | l Gl       | reA y        |
|------|---|------------|--------------|------------|------------|------------|------------|------------|-----------------|------------|--------------|------------|------------|------------|------------|------------|--------------|
| 5    |   | Ala<br>225 | a Ser        | : G13      | / Asi      | Trp        | His<br>230 |            | As <sub>I</sub> | Se.        | r Thi        | 235        |            | 1 Gl)      | , Yai      | o Arg      | y Va]<br>240 |
| 10   | • | Ile        | : Thr        | Thr        | : Ser      | Thr<br>245 | Arg        | Thr        | Trp             | Al.        | a Lev<br>250 |            | ) Ťhi      | туг        | : Asr      | Asn<br>255 |              |
|      |   | Lev        | Tyr          | Glu        | Gln<br>260 | lle        | Ser        | Ser        | Glu             | 265        | Ala          | Gly        | ' Sei      | The        | 270        |            | ) Asn        |
| 15 . |   | Thr        | Tyr          | Phe<br>275 | Gly        | Tyr        | Ser        | Thr        | Pro<br>280      |            | Gly          | Tyr        | Phe        | Asp<br>285 |            | : Asn      | Arg          |
| 20   |   | Phe        | His<br>290   | Суз        | His        | Phe        | Ser        | Pro<br>295 | Arg             | Asp        | Trp          | Gln        | Arg<br>300 |            | Ile        | neA:       | aeA          |
|      |   | Asn<br>305 | Trp          | Gly        | Phe        | Arg        | Pro<br>310 | Lys        | Lys             | Leu        | Arg          | Phe<br>315 |            | Leu        | Phe        | Asn        | Ile<br>320   |
| 25   |   | Gln        | Val          | Lys        | Glu        | Val<br>325 | Thr        | Thr        | Asn             | Asp        | 61y<br>330   | Val        | Thr        | Thr        | Ile        | Ala<br>335 |              |
| 30   |   | Asn        | Leu          | Thr        | Ser<br>340 | Thr        | Ile        | Gln        | Val             | Phe<br>345 | Ser          | Asp        | Ser        | Glu        | Tyr<br>350 | Gln        | Leu          |
|      |   | Pro        | Tyr          | Val<br>355 | Leu        | ely        | Ser        | Ala        | His<br>360      | Gln        | Gly          | Суз        | Leu        | Pro<br>365 | Pro        | Phe        | Pro          |
| 35   |   | Ala        | Asp<br>370   | Val        | Phe        | Met        | Ile        | Pro<br>375 | Gln             | Ťyr        | Gly          | Tyr        | Leu<br>380 | Thr        | Leu        | леA        | Asn          |
| 40   |   | Gly<br>385 | Ser          | Gln        | Ser        | Val        | Gly<br>390 | Arg        | Ser             | Ser        | Phe          | Tyr<br>395 | Суз        | Leu        | Glu        | Tyr        | Phe<br>400   |
|      |   | Pro        | Ser          | Gln        | Met        | Leu<br>405 | Arg        | Thr        | Gly             |            | Asn<br>410   |            | Glu        | Phe        | Ser        | Tyr<br>415 | Ser          |
| 45   |   | Phe        | Glu          | Ąsp        | Val<br>420 | Pro        | Phe        | His        | Ser             | Ser<br>425 | Tyr          | Ala        | His        | Ser        | Gln<br>430 | Ser        | Leu          |
| 50   |   | Asp        | Arg          | Leu<br>435 | Met        | neA        | Pro        | Leu        | Ile<br>440      | qeA        | Gln          | Tyr        | Геп        | Tyr<br>445 | Tyr        | Leu        | Ala          |
|      |   | Arg        | Thr<br>450   | Gln        | Ser        | Ąsp        | Pro        | Gly<br>455 | Gly             | Thr        | Ala          |            | Asn<br>460 | Arg        | Glu        | Leu        | Gln          |
| 55   |   |            |              |            |            |            |            |            |                 |            |              |            |            |            |            |            |              |

| 5         | Phe<br>465 |            | Gl:        | Gly        | , el <sup>7</sup> | 470               |            | Thi        | r Met      | : Ala      | 475        |            | n Ala      | Lys        | a Ası      | 1 Trp<br>480 |  |
|-----------|------------|------------|------------|------------|-------------------|-------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|--------------|--|
|           | Leu        | Pro        | o Gly      | Pro        | Cys<br>485        |                   | Arg        | Glr        | a Glr      | Arg<br>490 |            | . Ser      | . Lys      | Thr        | Le:<br>495 | Asp          |  |
| 10        | Gln        | Asr        | neA ı      | Asn<br>500 |                   | Asn               | Phe        | Ale        | Trp<br>505 |            | Gly        | Ala        | Thr        | Lys<br>510 |            | His          |  |
| 15        | Leu        | Asn        | 61y<br>515 |            | Asn               | Ser               | Leu        | Val<br>520 |            | Pro        | Gly        | Val        | Ala<br>525 |            | Ala        | Thr          |  |
|           | His        | Lys<br>530 |            | Asp        | Glu               | Ąsp               | Arg<br>535 |            | Phe        | Pro        | Ser        | Ser<br>540 | _          | Val        | Leu        | Ile          |  |
| 20        | Phe<br>545 |            | Lys        | Thr        | Gly               | <b>Ala</b><br>550 |            | Asn        | Lys        | Thr        | Thr<br>555 |            | Glu        | Asn        | Val        | Leu<br>560   |  |
| 25        | Met        | Thr        | Asn        | Glu        | Glu<br>565        | Glu               | Ile        | Arg        | Pro        | Thr<br>570 |            | Pro        | Val        | Ala        | Thr<br>575 | Glu          |  |
|           | Glu        | Tyr        | Gly        | Ile<br>580 | Val               | Ser               | Ser        | Asn        | Leu<br>585 | Gln        | Ala        | Ale        | neA        | Thr<br>590 | Ala        | Ala          |  |
| 30        | Gln        | Thr        | Gln<br>595 | Val        | Val               | neA               | Asn        | Gln<br>600 | Gly        | Ala        | Leu        | Pro        | Gly<br>605 | Met        | Val        | Trp          |  |
| <i>35</i> | Gln        | Asn<br>610 | Arg        | Asp        | Val               | Tyr               | Leu<br>615 | Gln        | Gly        | Pro        | Ile        | Trp<br>620 | Ala        | Lys        | Ile        | Pro          |  |
|           | His<br>625 | Thr        | Asp        | Gly        | Asn               | Phe<br>630        | His        | Pro        | Ser        | Pro        | Leu<br>635 | Met        | Gly        | Gly        | Phe        | Gly<br>640   |  |
| 40        | Leu        | Lys        | His        | Pro        | Pro<br>645        | Pro               | Gln        | Ile        | Leu        | Ile<br>650 | Lys        | Asn        | Thr        | Pro        | Val<br>655 | Pro          |  |
| 45        | Ala        | Asn        | Pro        | Pro<br>660 | Glu               | Val               | Phe        | Thr        | Pro<br>665 | Ala        | Lys        | Phe        | Ala        | Ser<br>670 | Phe        | Ile          |  |
|           | Thr        | Gln        | Tyr<br>675 | Ser        | Thr               | Gly               | Gln        | Val<br>680 | Ser        | Val        | Glu        | Ile        | Glu<br>685 | Trp        | Glu        | Leu          |  |
|           | Gln        | Lys<br>690 | Glu        | Asn        | Ser               | Lys               | Arg<br>695 | Trp        | Asp        | Pro        | Glu        | Ile<br>700 | Gln        | Tyr        | Thr        | Ser          |  |
| 55        | Asn<br>705 | Phe        | Glu        | Lys        | Gln               | Thr<br>710        | Gly        | Val        | Asp        | Phe        | Ala<br>715 | Val        | Asp        | Ser        | Gln        | Gly<br>720   |  |

|    |                           | Val               | Туз        | s Se       | r Glu         | 725        |            | g Pr       | o Il       | e Gl       | y Th<br>73 | -          | g Ty:      | r Le       | u Thi        | 73:        | g <b>As</b> n<br>5 |
|----|---------------------------|-------------------|------------|------------|---------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|--------------|------------|--------------------|
| 5  |                           | Lev               | 1          |            |               |            |            |            |            |            |            |            |            |            |              |            |                    |
| 10 | <210><211><211><212><213> | 644<br>PRT        | d prote    | ein of     | AAV s         | erotyp     | oe, clo    | ne 22      | 3-4        |            |            |            |            |            |              |            |                    |
| 15 | <400>                     | 73                |            |            |               |            |            |            |            |            |            |            |            |            |              |            |                    |
|    |                           | Lys               | Ala        | Туг        | ge <i>A</i> : | Gln<br>5   | Gln        | Leu        | Ly:        | Ala        | Gly<br>10  | ASP        | Asn        | Pro        | Tyr          | Leu<br>15  | Arg                |
| 20 |                           | Tyr               | Asn        | His        | Ala<br>20     | Asp        | Ala        | Glu        | Phe        | Gln<br>25  | Glu        | Arg        | Leu        | Gln        | Glu<br>30    | qeA        | Thr                |
| 25 |                           | Ser               | Phe        | Gly<br>35  | Gly           | Asn        | Leu        | Gly        | Arg<br>40  | Ala        | Val        | Phe        | Gln        | Ala<br>45  | Lys          | Lys        | Arg                |
|    |                           | Val               | Leu<br>50  | Glu        | Pro           | Leu        | Gly        | Leu<br>55  | Val        | Glu        | Thr        | Pro        | Ala<br>60  | Lys        | Thr          | Ala        | Pro                |
| 30 |                           | Gly<br>65         | ГÀа        | Lys        | Arg           | Pro        | Val<br>70  | Asp        | Ser        | Pro        | qeA        | Ser<br>75  | Thr        | Ser        | Gly          | Ile        | 80<br>GJY          |
| 35 |                           | Lys               | Lys        | Gly        | Gln           | Gln<br>85  | Pro        | Ala        | Lys        | Lys        | Arg<br>90  | Leu        | Asn        | Phe        | Gly          | Gln<br>95  | Thr                |
|    |                           | Gly               | Asp        | Ser        | Glu<br>100    | Pro        | Val        | Pro        | Asp        | Pro<br>105 | Gln        | Pro        | Ile        | Gly        | Glu<br>110   | Pro        | Pro                |
| 40 |                           | Ala               | Gly        | Pro<br>115 | Ser           | Gly        | Leu        | Gly        | Ser<br>120 | Gly        | Thr        | Met        | Ala        | Ala<br>125 | Gly          | Gly        | Gly                |
| 45 |                           | Ala               | Pro<br>130 | Met        | Ala           | Asp        | aeA        | Asn<br>135 | G1u        | GJY        | Ala        | Asp        | Gly<br>140 | Val        | Gly          | Asn        | Ala                |
|    |                           | <b>Ser</b><br>145 | Gly        | Asn        | Trp           | His        | Суз<br>150 | Asp        | Ser        | Thr        | Arg        | Leu<br>155 | Gly        | Ąsp        | Arg          | Val        | Ile<br>160         |
| 50 | ÷                         | The               | Thr        | Ser        | Thr           | Arg<br>165 | Thr        | Trp        | Ala        | Leu        | Pro<br>170 | Thr        | Tyr        | Asn        |              | His<br>175 | Leu                |
| 55 | ,                         | Tyr :             | Lys        | Gln        | Ile<br>180    | Ser .      | Ser        | Gln        |            | Ala<br>185 | Gly        | Ser        | Thr        | Asn        | Asp .<br>190 | Asn        | Val                |
|    | •                         | Tyr :             | Phe        | Gly<br>195 | Tyr :         | Ser (      | Phr        |            | Trp<br>200 | Gly        | Tyr        | Phe        |            | Phe<br>205 | . neA        | Arg        | Phe                |

| 5         |   | His        | Cys<br>210 |            | Phe        | Ser        | Pro        | Arg<br>215 |            | Trp        | Gln        | Arg        | Leu<br>220 | Ile        | Asn        | neA        | Asn        |
|-----------|---|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| 3         |   | Trp<br>225 |            | Phe        | Arg        | Pro        | Lys<br>230 |            | Leu        | Asn        | Phe        | Lys<br>235 |            | Phe        | Asn        | Ile        | Gln<br>240 |
| 10        |   | Val        | Lys        | Glu        | Val        | Thr<br>245 |            | Asn        | Ążp        | Gly        | Val<br>250 |            | Thr        | Ile        | Ala        | Asn<br>255 | Asn        |
| 15        |   | Leu        | Thr        | Ser        | Thr<br>260 | Val        | Gln        | Val        | Phe        | Ser<br>265 | Ąsp        | Ser        | Glu        | Tyr        | Gln<br>270 | Leu        | Pro        |
| ,,,       |   | Tyr        | Val        | Leu<br>275 | Gly        | Ser        | Ala        | His        | Gln<br>280 | Gly        | Cys        | Leu        | Pro        | Pro<br>285 | Phe        | Pro        | Ala        |
| 20        |   | Asp        | Val<br>290 | Phe        | Met        | Ile        | Pro        | Gln<br>295 | Tyr        | Gly        | Tyr        | Leu        | Thr<br>300 | Leu        | Asn        | Asn        | Gly        |
| 25        |   | Ser<br>305 | Gln        | Ser        | Val        | Gly        | Arg<br>310 | Ser        | Ser        | Phe        | туг        | Cys<br>315 | Leu        | Glu        | Tyr        | Phe        | Pro<br>320 |
|           |   | Ser        | Gln        | Met        | Leu        | Arg<br>325 | Thr        | Gly        | Asn        | Asn        | Phe<br>330 | Thr        | Phe        | Ser        | Tyr        | Thr<br>335 | Phe        |
| 30        |   | Glu        | Asp        | Val        | Pro<br>340 | Phe        | His        | Ser        | Ser        | Tyr<br>345 | Aļa        | His        | Ser        | Gln        | ser<br>350 | Leu        | Gly        |
| <i>35</i> |   | Arg        | Leu        | Met<br>355 | Asn        | Pro        | Leu        | Ile        | Asp<br>360 | Gln        | Tyr        | Leu        | Tyr        | Tyr<br>365 | Leu        | Ala        | Arg        |
|           |   | Thr        | Gln<br>370 | Ser        | Asn        | Ala        | Gly        | Gly<br>375 | Thr        | Ala        | Gly        | Asn        | Arg<br>380 | Glu        | Leu        | Gln        | Phe        |
| 40        |   | Tyr<br>385 | Gln        | Gly        | Gly        | Pro        | Thr<br>390 | Thr        | Met        | Ala        | Glu        | Gln<br>395 | Ala        | Lys        | Asn        | Trp        | Leu<br>400 |
| 45        |   | Pro        | Gly        | Pro        | Cys        | Phe<br>405 | Arg        | Gln        | Gln        | Arg        | Val<br>410 | Ser        | Lys        | Thr        | Leu        | Asp<br>415 | Gln        |
|           | * | Asn        | neA        | Asn        | Ser<br>420 | Asn        | Phe        | Ala        | Тгр        | Thr<br>425 | Gly        | Ala        | Thr        | Lys        | Tyr<br>430 | His        | Leu        |
| 50        | * | Asn        | Gly        | Arg<br>435 | Asn        | Ser        | Leu        | Val        | Asn<br>440 | Pro        | Gly        | .Val       | Ala        | Met<br>445 | Ala        | Thr        | His        |
| 55        |   | Lys        | Asp<br>450 | qeA        | Glu        | Glu        | Arg        | Phe<br>455 | Phe        | Pro        | Ser        | Ser        | Gly<br>460 | Val        | Leu        | Ile        | Phe        |

| 5  |                                                | Gly<br>465 |            | Thr               | Gly        | Ala        | Ala<br>470         | Asn        | Lys        | Thr        | Thr        | Leu<br>475 | Glп               | Asn        | Val        | Leu        | Met<br>480 |
|----|------------------------------------------------|------------|------------|-------------------|------------|------------|--------------------|------------|------------|------------|------------|------------|-------------------|------------|------------|------------|------------|
|    |                                                | Thr        |            | e1n               |            | Glu<br>485 | Ile                | Arg        | Pro        | Thr        | Asn<br>490 | Pro        | Val               | Ala        | Thr        | Glu<br>495 | Glu        |
| 10 |                                                | Tyr        |            |                   |            | Ser        | Ser                | Asn        | Leu        | Gln<br>505 | Ala        | Ala        | Ser               | Thr        | Ala<br>510 | Ala        | Gln        |
| 15 |                                                | Thr        | Gln        | Val<br>515        | Val        | Asn        | Asn                | Gln        | Gly<br>520 | Ala        | Leu        | Pro        | Gly               | Met<br>525 | Val        | Trp        | Gln        |
|    |                                                | Asn        | Arg<br>530 | qeA               | Val        | Tyr        | Leu                | Gln<br>535 | Gly        | Pro        | Ile        | Trp        | Ala<br>540        | Lys        | Ile        | Pro        | His        |
| 20 |                                                | Thr<br>545 | qeA        | Gly               | Asn        |            | His<br>550         | Pro        | Ser        | Pro        | Leu        | Met<br>555 | Gly               | Gly        | Phe        | Gly        | Leu<br>560 |
| 25 |                                                | Lys        | His        | Pro               | Pro        | 565        | Gln                | Ilė        | Leu        | Ile        | Lys<br>570 | Asn        | Thr               | Pro        | Val        | Pro<br>575 | Ala        |
|    |                                                | Asn        | Pro        | Pro               | Glu<br>580 | Val        | Phe                | Thr        | Pro        | Ala<br>585 | Lys        | Phe        | Ala               | Ser        | Phe<br>590 | Ile        | Thr        |
| 30 |                                                | Gln        | Tyr        | <b>Ser</b><br>595 | Thr        | Gly        | Gln                | Val        | Ser<br>600 | Val        | Glu        | Ile        | Glu               | Trp<br>605 | Glu        | Leu        | Gln        |
| 35 |                                                | Lys        | 610        | Asn               | Ser        | Lys        | Arg                | Trp<br>615 | Asn        | Pro        | Glu        | Ile        | <b>Gln</b><br>620 | Tyr        | Thr        | Ser        | Asn        |
|    |                                                | Phe<br>625 | Asp        | Lys               | Gln        | Thr        | <b>G</b> ly<br>630 | Val        | Asp        | Phe        | Ala        | Val<br>635 | Asp               | Ser        | Gln        | Gly        | Val<br>640 |
| 40 |                                                | Tyr        | Ser        | Glu               | Pro        |            |                    |            |            |            |            |            |                   |            |            |            |            |
| 45 | <210> 74<br><211> 644<br><212> PR<br><213> cap | T          | otein d    | of AA\            | / sero     | type, c    | olone 2            | 223.5      |            | ,          |            |            |                   |            |            |            |            |

<400> 74

50

55

|    |    | Lys<br>1 | Ala | Tyr       | Asp       | Gln<br>5 | Gln | Leu | Lys       | Ala       | Gly<br>10 | Asp      | Asn | Pro       | Tyr       | Leu<br>15 | Arg |
|----|----|----------|-----|-----------|-----------|----------|-----|-----|-----------|-----------|-----------|----------|-----|-----------|-----------|-----------|-----|
| 5  |    | Tyr      | Asn | His       | Ala<br>20 | Asp      | Ala | Glu | Phe       | Gln<br>25 | G1u       | Arg      | Leu | Gln       | Glu<br>30 | Asp       | Thr |
| 10 | ٠. | Ser      | Phe | Gly<br>35 | Gly       | neA      | Leu | Gly | Arg<br>40 | Ala       | Val       | Phe<br>, | Gln | Ala<br>45 | ГÀЗ       | Lys       | Arg |
| 15 |    |          |     |           |           |          |     |     |           |           |           |          |     |           |           |           |     |
| 20 |    |          |     |           |           |          |     |     |           |           |           |          |     |           |           |           |     |
| 25 |    |          |     |           |           |          |     |     |           |           |           |          |     |           |           |           |     |
| 30 |    |          |     |           |           |          |     |     |           |           |           |          |     |           |           |           |     |
| 35 |    |          |     |           |           |          |     |     |           |           |           |          |     |           |           |           |     |
| 40 |    |          |     |           |           |          |     |     |           |           |           |          |     |           |           |           |     |
| 45 |    | ٠        |     |           |           |          |     |     |           |           |           |          |     |           |           |           |     |
| 50 | 1  |          |     |           |           |          |     |     |           |           |           |          |     |           |           |           |     |
| 55 |    |          |     |           |           |          |     |     |           |           |           |          |     |           |           |           |     |

| Gly Lys Lys Arg Pro Val Asp Ser Pro Asp Ser Thr Ser Gly I  Clys Lys Gly Gln Gln Pro Ala Lys Lys Arg Leu Asn Phe Gly G  S5  Gly Asp Ser Glu Pro Val Pro Asp Pro Gln Pro Ile Gly Glu Pro  100  Ala Gly Pro Ser Gly Leu Gly Ser Gly Thr Met Ala Ala Gly Gl  115  Ala Fro Met Ala Asp Asn Asn Glu Gly Ala Asp Gly Val Gly As  130  Ser Gly Asn Trp His Cys Asp Ser Thr Arg Leu Gly Asp Arg Va  145  Thr Thr Ser Thr Arg Thr Trp Ala Leu Pro Thr Tyr Asn Asn Hi  165  Tyr Lys Gln Ile Ser Ser Gln Ser Ala Gly Ser Thr Asn Asp Asn  180  Tyr Phe Gly Tyr Ser Thr Pro Trp Gly Tyr Phe Asp Phe Asn Arg  295  His Cys His Phe Ser Pro Arg Asp Trp Gln Arg Leu Ile Asn Asn  296  Trp Gly Phe Arg Pro Lys Lys Leu Asn Phe Lys Leu Phe Asn Ile  297  298  Val Lys Glu Val Thr Thr Asn Asp Gly Val Thr Thr Ile Ala Asn  299  Tyr Val Leu Gly Ser Ala His Gln Gly Cys Leu Pro Pro Phe Pro  290  Tyr Val Leu Gly Ser Ala His Gln Gly Cys Leu Pro Pro Phe Pro  290  Asp Val Phe Met Ile Pro Gln Tyr Gly Tyr Leu Thr Leu Asn Asn | Ala Pro        |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|
| 61y Asp Ser Glu Pro Val Pro Asp Pro Gln Pro Ile Gly Glu Pro 110  Ala Gly Pro Ser Gly Leu Gly Ser Gly Thr Met Ala Ala Gly Glu Pro 115  Ala Gly Pro Ser Gly Leu Gly Ser Gly Thr Met Ala Ala Gly Gly Ala 125  Ala Pro Met Ala Asp Asn Asn Glu Gly Ala Asp Gly Val Gly Ass 130  Ser Gly Asn Trp His Cys Asp Ser Thr Arg Leu Gly Asp Arg Val 145  Thr Thr Ser Thr Arg Thr Trp Ala Leu Pro Thr Tyr Asn Asn Hi 170  Tyr Lys Gln Ile Ser Ser Gln Ser Ala Gly Ser Thr Asn Asp Ass 185  Tyr Phe Gly Tyr Ser Thr Pro Trp Gly Tyr Phe Asp Phe Asn Arg 195  His Cys His Phe Ser Pro Arg Asp Trp Gln Arg Leu Ile Asn Asr 210  Trp Gly Phe Arg Pro Lys Lys Leu Asn Phe Lys Leu Phe Asn Ile 225  Val Lys Glu Val Thr Thr Asn Asp Gly Val Thr Thr Ile Ala Asn 245  Leu Thr Ser Thr Val Gln Val Phe Ser Asp Ser Glu Tyr Gln Leu 260  Tyr Val Leu Gly Ser Ala His Gln Gly Cys Leu Pro Pro Phe Pro 275  Tyr Val Leu Gly Ser Ala His Gln Gly Cys Leu Pro Pro Phe Pro 285                                                             | le Gly         |
| Ala Gly Pro Ser Gly Leu Gly Ser Gly Thr Met Ala Ala Gly Gly Cly Leu Gly Ash Ash Glu Gly Ala Asp Gly Val Gly Ash Iso Ser Gly Ash Ash Glu Gly Ala Asp Gly Val Gly Ash Iso Ser Gly Ash Trp His Cys Asp Ser Thr Arg Leu Gly Asp Arg Val 145  Thr Thr Ser Thr Arg Thr Trp Ala Leu Pro Thr Tyr Ash Ash Hi 165  Tyr Lys Gln Ile Ser Ser Gln Ser Ala Gly Ser Thr Ash Ash Ash 190  Tyr Phe Gly Tyr Ser Thr Pro Trp Gly Tyr Phe Asp Phe Ash Arg 195  His Cys His Phe Ser Pro Arg Asp Trp Gln Arg Leu Ile Ash Ash 2210  Trp Gly Phe Arg Pro Lys Lys Leu Ash Phe Lys Leu Phe Ash Ile 225  Val Lys Glu Val Thr Thr Ash Asp Gly Val Thr Thr Ile Ala Ash 245  Leu Thr Ser Thr Val Gln Val Phe Ser Asp Ser Glu Tyr Gln Leu 260  Tyr Val Leu Gly Ser Ala His Gln Gly Cys Leu Pro Pro Phe Pro 275  Tyr Val Leu Gly Ser Ala His Gln Gly Cys Leu Pro Pro Phe Pro 275                                                                                                                                                                |                |
| Ala Gly Pro Ser Gly Leu Gly Ser Gly Thr Met Ala Ala Gly Gly Gly 115  Ala Pro Met Ala Asp Asn Asn Glu Gly Ala Asp Gly Val Gly As 130 Met Ala Asp Asn Asn Glu Gly Ala Asp Gly Val Gly As 130 Ser Gly Asn Trp His Cys Asp Ser Thr Arg Leu Gly Asp Arg Val 145  Thr Thr Ser Thr Arg Thr Trp Ala Leu Pro Thr Tyr Asn Asn Hi 177  Tyr Lys Gln Ile Ser Ser Gln Ser Ala Gly Ser Thr Asn Asp Ass 185  Tyr Phe Gly Tyr Ser Thr Pro Trp Gly Tyr Phe Asp Phe Asn Arg 195  His Cys His Phe Ser Pro Arg Asp Trp Gln Arg Leu Ile Asn Asr 215  His Cys His Phe Ser Pro Lys Lys Leu Asn Phe Lys Leu Phe Asn Ile 225  Val Lys Glu Val Thr Thr Asn Asp Gly Val Thr Thr Ile Ala Asn 245  Leu Thr Ser Thr Val Gln Val Phe Ser Asp Ser Glu Tyr Gln Leu 265  Tyr Val Leu Gly Ser Ala His Gln Gly Cys Leu Pro Pro Phe Pro 275  Tyr Val Leu Gly Ser Ala His Gln Gly Cys Leu Pro Pro Phe Pro 275                                                                                                                                          | ro Pro         |
| Ser Gly Asn Trp His Cys Asp Ser Thr Arg Leu Gly Asp Arg Variation 145  Thr Thr Ser Thr Arg Thr Trp Ala Leu Pro Thr Tyr Asn Asn Hi 177  Tyr Lys Gln Ile Ser Ser Gln Ser Ala Gly Ser Thr Asn Asp Asn 190  Tyr Phe Gly Tyr Ser Thr Pro Trp Gly Tyr Phe Asp Phe Asn Arg 195  His Cys His Phe Ser Pro Arg Asp Trp Gln Arg Leu Ile Asn Asr 210  Trp Gly Phe Arg Pro Lys Lys Leu Asn Phe Lys Leu Phe Asn Ile 225  Val Lys Glu Val Thr Thr Asn Asp Gly Val Thr Thr Ile Ala Asn 245  Leu Thr Ser Thr Val Gln Val Phe Ser Asp Ser Glu Tyr Gln Leu 260  Tyr Val Leu Gly Ser Ala His Gln Gly Cys Leu Pro Pro Phe Pro 280  Tyr Val Leu Gly Ser Ala His Gln Gly Cys Leu Pro Pro Phe Pro 280                                                                                                                                                                                                                                                                                                                                   | l <b>y</b> Gly |
| The The Ser The Arg The Trp Ala Leu Pro The Tyr Asn Asn Hi 177  Tyr Lys Gln Ile Ser Ser Gln Ser Ala Gly Ser The Asn Asn Asn 190  Tyr Phe Gly Tyr Ser The Pro Trp Gly Tyr Phe Asp Phe Asn Arg 205  His Cys His Phe Ser Pro Arg Asp Trp Gln Arg Leu Ile Asn Asn 210  Trp Gly Phe Arg Pro Lys Lys Leu Asn Phe Lys Leu Phe Asn Ile 225  Val Lys Glu Val The The Asn Asp Gly Val The The Ile Ala Asn 255  Leu The Ser The Val Gln Val Phe Ser Asp Ser Glu Tyr Gln Leu 260  Tyr Val Leu Gly Ser Ala His Gln Gly Cys Leu Pro Pro Phe Pro 255  Tyr Val Leu Gly Ser Ala His Gln Gly Cys Leu Pro Pro Phe Pro 255                                                                                                                                                                                                                                                                                                                                                                                                          | sn Ala         |
| Thr Thr Ser Thr Arg Thr Trp Ala Leu Pro Thr Tyr Asn Asn Hi 17  Tyr Lys Gln Ile Ser Ser Gln Ser Ala Gly Ser Thr Asn Asp Asg 190  Tyr Phe Gly Tyr Ser Thr Pro Trp Gly Tyr Phe Asp Phe Asn Arg 205  His Cys His Phe Ser Pro Arg Asp Trp Gln Arg Leu Ile Asn Asg 210  Tyr Gly Phe Arg Pro Lys Lys Leu Asn Phe Lys Leu Phe Asn Ile 225  Val Lys Glu Val Thr Thr Asn Asp Gly Val Thr Thr Ile Ala Asn 255  Leu Thr Ser Thr Val Gln Val Phe Ser Asp Ser Glu Tyr Gln Leu 270  Tyr Val Leu Gly Ser Ala His Gln Gly Cys Leu Pro Phe Pro 280  Tyr Val Leu Gly Ser Ala His Gln Gly Cys Leu Pro Pro Phe Pro 285                                                                                                                                                                                                                                                                                                                                                                                                               | al Ile<br>160  |
| Tyr Phe Gly Tyr Ser Thr Pro Trp Gly Tyr Phe Asp Phe Asn Arg 205  His Cys His Phe Ser Pro Arg Asp Trp Gln Arg Leu Ile Asn Asr 210  Trp Gly Phe Arg Pro Lys Lys Leu Asn Phe Lys Leu Phe Asn Ile 225  Val Lys Glu Val Thr Thr Asn Asp Gly Val Thr Thr Ile Ala Asn 245  Leu Thr Ser Thr Val Gln Val Phe Ser Asp Ser Glu Tyr Gln Leu 260  Tyr Val Leu Gly Ser Ala His Gln Gly Cys Leu Pro Pro Phe Pro 285                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                |
| His Cys His Phe Ser Pro Arg Asp Trp Gln Arg Leu Ile Asn Asr 210  Trp Gly Phe Arg Pro Lys Lys Leu Asn Phe Lys Leu Phe Asn Ile 225  Val Lys Glu Val Thr Thr Asn Asp Gly Val Thr Thr Ile Ala Asn 245  Leu Thr Ser Thr Val Gln Val Phe Ser Asp Ser Glu Tyr Gln Leu 260  Tyr Val Leu Gly Ser Ala His Gln Gly Cys Leu Pro Pro Phe Pro 285                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | n Val          |
| His Cys His Phe Ser Pro Arg Asp Trp Gln Arg Leu Ile Asn Ass 210  Trp Gly Phe Arg Pro Lys Lys Leu Asn Phe Lys Leu Phe Asn Ile 225  Val Lys Glu Val Thr Thr Asn Asp Gly Val Thr Thr Ile Ala Asn 255  Leu Thr Ser Thr Val Gln Val Phe Ser Asp Ser Glu Tyr Gln Leu 260  Tyr Val Leu Gly Ser Ala His Gln Gly Cys Leu Pro Pro Phe Pro 285                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | g Phe          |
| Val Lys Glu Val Thr Thr Asn Asp Gly Val Thr Thr Ile Ala Asn 245  Leu Thr Ser Thr Val Gln Val Phe Ser Asp Ser Glu Tyr Gln Leu 260  Tyr Val Leu Gly Ser Ala His Gln Gly Cys Leu Pro Pro Phe Pro 275                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | n Asn          |
| Leu Thr Ser Thr Val Gln Val Phe Ser Asp Ser Glu Tyr Gln Leu 260 265 270  Tyr Val Leu Gly Ser Ala His Gln Gly Cys Leu Pro Pro Phe Pro 275 280 285                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | e Gln<br>240   |
| Leu Thr Ser Thr Val Gln Val Phe Ser Asp Ser Glu Tyr Gln Leu 260 265 270  Tyr Val Leu Gly Ser Ala His Gln Gly Cys Leu Pro Pro Phe Pro 275 280 285                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                |
| 275 280 285                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | ı Pro          |
| ·                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | ) Ala          |
| 290 295 300                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Gly            |

| · 5 | Ser<br>305 |            | Ser        | Val        | Gly        | Arg<br>310 |            | Ser        | Phe               | Tyr        | Cys<br>315 |             | Glu        | Tyr               | Phe        | Pro<br>320 |
|-----|------------|------------|------------|------------|------------|------------|------------|------------|-------------------|------------|------------|-------------|------------|-------------------|------------|------------|
| J   | Ser        | Gln        | Met        | Leu        | Arg<br>325 |            | Gly        | Asn        | Asn               | Phe<br>330 |            | Phe         | Ser        | Tyr               | Thr<br>335 | Phe        |
| 10  | Glu        | qeA        | Val        | Pro<br>340 |            | His        | Ser        | Ser        | Tyr<br>345        |            | His        | Ser         | •Gln       | ser<br>350        |            | Gly        |
| 15  | Arg        | Leu        | Met<br>355 |            | Pro        | Leu        | Ile        | Asp<br>360 |                   | Tyr        | Leu        | Tyr         | Туг<br>365 | Leu               | Ala        | Arg        |
|     | Thr        | Gln<br>370 | Ser        | Asn        | Ala        | Gly        | Gly<br>375 | Thr        | Ala               | Gly        | Asn        | Arg<br>380  | Glu        | Leu               | Gln        | Phe        |
| 20  | Tyr<br>385 | Gln        | Gly        | Gly        | Pro        | Thr<br>390 | Thr        | Met        | Ala               | Glu        | Gln<br>395 | Ala         | Lys        | Asn               | Trp        | Leu<br>400 |
| 25  | Pro        | Gly        | Pro        | Суз        | Phe<br>405 | Arg        | Gln        | Gln        | Arg               | Val<br>410 | Ser        | Lys         | Thr        | Leu               | Asp<br>415 | Gln        |
|     | aeA        | Asn        | Asn        | Ser<br>420 | Asn        | Phe        | Ala        | Trp        | Thr<br>425        | Gly        | Ala        | Thr         | Lys        | Tyr<br>430        | His        | Leu        |
| 30  | aeA        | Gly        | Arg<br>435 |            | Ser        | Leu        | Val        | Asn<br>440 | Pro               | Gly        | Val        | Ala         | Met<br>445 | Ala               | Thr        | His        |
| 35  | Lys        | Asp<br>450 | Asp        | Glu        | Glu        | Arg        | Phe<br>455 | Phe        | Pro               | Ser        | Ser        | Gly<br>460  | Val        | Leu               | Ile        | Phe        |
|     | Gly<br>465 | Lys        | Thr        | Gly        | Ala        | Ala<br>470 | Asn        | Lys        | Thr               | Thr        | Leu<br>475 | Glu         | Asn        | Val               | Leu        | Met<br>480 |
| 40  | Thr        | Asn        | Glu        | Glu        | Glu<br>485 | Ile        | Arg        | Pro        | Thr               | Asn<br>490 | Pro        | Val         | Ala        | Thr               | Glu<br>495 | Glu        |
| 45  | Tyr        | Gly        | Ile        | Val<br>500 | Ser        | Ser        | Asn        | Leu        | <b>Gln</b><br>505 | Ala        | Ala        | Ser         | Thr        | <b>Ala</b><br>510 | Ala        | Gln        |
|     | Thr        | Gln        | Val<br>515 | Val        | Asn        | Asn        | Gln        | Gly<br>520 | Ala               | Leu        | Pro        | <i>e</i> 1à | Met<br>525 | Val               | Trp        | Gln        |
| 50  | Asn        | Arg<br>530 | qeA        | Val        | Tyr        | Leu        | Gln<br>535 | Gly        | Pro               | Ile        | Trp        | Ala<br>540  | Lys        | Ile               | Pro        | His        |
| 55  | Thr<br>545 | Asp        | Gly        | neA        | Phe        | His<br>550 | Pro        | Ser        | Pro               | Геп        | Met<br>555 | Gly         | Gly        | Phe               | Gly        | Leu<br>560 |

|    |                                            | Lys        | s Hi:      | s Pr      | o Pr           | o Pro<br>565 |            | n Il       | e Le      | u Il      | e Lys<br>570 |             | Th:        | r Pr       | o Va       | 1 Pr<br>57 | o Ala<br>5   |
|----|--------------------------------------------|------------|------------|-----------|----------------|--------------|------------|------------|-----------|-----------|--------------|-------------|------------|------------|------------|------------|--------------|
| 5  |                                            | Ası        | n Pro      | o Pr      | 0 Gl:<br>586   | u Val        | L Pho      | e Th       | r Pro     | 585       |              | Phe         | Ala        | a Se.      | r Ph<br>59 |            | e Thr        |
| 10 |                                            | Glr        | туз        | 5 Se:     | Thi            | Gly          | Gl:        | ı Va       | 600       |           | l Glu        | Ile         | Glu        | Tr;<br>60: |            | u Le       | u Gln        |
|    |                                            | Lys        | Glu<br>610 | ı Ası     | n Ser          | Lys          | Arg        | Trp<br>615 | Asr       | Pro       | Glu          | Ile         | Gln<br>620 |            | Thi        | Se:        | r Asn        |
| 15 |                                            | Phe<br>625 | Asp        | Lys       | Gln            | Thr          | Gly<br>630 | Val        | . Азр     | Phe       | Ala          | Val<br>635  | qeA        | Ser        | : Glr      | , ej       | / Val<br>640 |
| 20 |                                            | Tyr        | Ser        | Glu       | Pro            | •            |            |            |           |           |              |             |            |            |            |            |              |
| 25 | <210> 75 <211> 64 <212> PF <213> ca        | 4<br>?T    | rotein     | of A      | <b>∖</b> V ser | otype,       | clone      | 223.1      | 10        |           |              |             |            |            |            |            |              |
| 30 | <220><br><221> MI<br><222> (43<br><223> ca | 34)(4      | 34)        |           | cid .          |              |            |            |           |           |              |             |            |            |            |            |              |
|    | <400> 75                                   |            |            |           |                |              |            |            |           |           |              |             |            |            |            |            |              |
| 35 |                                            | Lys<br>1   | Ala        | Tyr       | Ąsp            | Gln<br>5     | Gln        | Leu        | Lys       | Ala       | Gly<br>10    | qeA         | Asn        | Pro        | Tyr        | Leu<br>15  | Arg          |
| 40 |                                            | Tyr        | Asn        | His       | Ala<br>20      | Asp          | Ala        | Glu        | Phe       | Gln<br>25 | Glu          | Arg         | Leu        | Gln        | Glu<br>30  | Asp        | Thr          |
|    |                                            | Ser        | Phe        | Gly<br>35 | Gly            | Asn          | Leu        | Gly        | Arg<br>40 | Ala       | Val          | Phe         | Gln        | Ala<br>45  | Lys        | Lys        | Arg          |
| 45 |                                            | Val        | Leu<br>50  | Glu       | Pro            | Leu          | Gly        | Leu<br>55  | Val       | Glu       | Thr          |             | Ala<br>60  | Lys        | Thr        | Ala        | Pro          |
| 50 | •                                          | Gly<br>65  |            | ГÀЗ       | Arg            | Pro          | Val<br>70  | Asp        | Ser       | Pro .     |              | Ser :<br>75 | Thr        | Ser        | Gly        | Ile        | Gly<br>80    |
|    |                                            |            |            |           |                |              |            |            |           |           |              |             |            |            |            |            |              |
|    | :                                          | Lys        | Lys        | Gly       | Gln            | Gln :<br>85  | Pro        | Ala        | Lys       | Lys .     | Arg 1<br>90  | Leu 1       | Asn        | Phe        | Gly        | Gln<br>95  | Thr          |

| 5         | Ala        | a Gl       | / Pro      |            | : Gly      | / Lev      | Gly        | Ser<br>120 |            | / Thi      | . Met      | Ala        | Ala<br>125  |            | , Gly      | A esta       |
|-----------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|-------------|------------|------------|--------------|
|           | Ala        | 130        |            | : Ala      | ls.        | Asn        | 135        |            | ı Gly      | / Ala      | Asp        | Gly<br>140 |             | . Gly      | Asr.       | Ala          |
| 10        | Ser<br>145 |            | Asn        | Trp        | His        | 150        |            | Ser        | Thr        | Trp        | 155        |            | Asp         | Arg        | Val        | . Ile<br>160 |
| 15        | Thr        | Thr        | Ser        | Thr        | Arg<br>165 |            | Trp        | Ala        | Leu        | 170        |            | Tyr        | Asn         | Asn        | His<br>175 | Leu          |
|           | Tyr        | Lys        | Gln        | Ile<br>180 | Ser        | Ser        | Gln        | Ser        | Ala<br>185 |            | Ser        | Thr        | Asn         | Asp<br>190 |            | Val          |
| 20        | Tyr        | Phe        | Gly<br>195 |            | Ser        | Thr        | Pro        | Trp<br>200 |            | Tyr        | Phe        | qeA        | Phe<br>205  | Asn        | Arg        | Phe          |
| <b>25</b> | His        | Cys<br>210 | His        | Phe        | Ser        | Pro        | Arg<br>215 | Asp        | Trp        | Gln        | Arg        | Leu<br>220 | Ile         | Asn        | Asn        | neA          |
|           | Trp<br>225 | Gly        | Phe        | Arg        | Pro        | Lys<br>230 | Lys        | Leu        | Asn        | Phe        | Lys<br>235 | Leu        | Phe         | Asn        | Ile        | Gln<br>240   |
| 30        | Val        | Lys        | Glu        | Val        | Thr<br>245 | Thr        | Asn        | Asp        | Gly        | Val<br>250 | Thr        | Thr        | Ile         | Ala        | Asn<br>255 | Asn          |
| 35        | ٠          |            |            | Thr<br>260 |            |            |            |            | 265        |            |            |            |             | 270        |            |              |
|           | Tyr        | Val        | Leu<br>275 | Gly        | Ser        | Ala        | His        | Gln<br>280 | Gly        | Суз        | Leu        | Pro        | Pro<br>285  | Phe        | Pro        | Ala          |
| 40        | Asp        | Val<br>290 | Phe        | Met        | Ile        | Pro        | Gln<br>295 | Tyr        | Gly        | Tyr        | Leu        | Thr<br>300 | Leu         | Asn        | Asn        | Gly          |
| 45        | Ser<br>305 | Gln        | Ser        | Val        | Gly        | Arg<br>310 | Ser        | Ser        | Phe        | Tyr        | Cys<br>315 | Leu        | <b>Gl</b> u | Tyr        | Phe        | Pro<br>320   |
|           | Ser        | Gln        | Met        | Leu        | Arg<br>325 | Thr        | Gly        | Asn        | Asn        | Phe<br>330 | Thr        | Phe        | Ser         | Tyr        | Thr<br>335 | Phe          |
| • .       | Glu        | Ąsp        | Val        | Pro<br>340 | Phe        | His        | Ser        | Ser        | Tyr<br>345 | Ala        | His        | Ser        | Gln         | Ser<br>350 | Leu        | Asp          |
| 55        | Arg        | Leu        | Met<br>355 | Asn        | Pro        | Leu        |            | Asp<br>360 | Gln        | Tyr        | Leu '      |            | Tyr<br>365  | Leu        | Ala        | Arg          |

| 5  |   | Thr        | Gln<br>370 |            | Asn        | Ala        | a Gly      | Gly<br>375 |            | Ala        | Gly              | Asn        | Arg<br>380 |            | Leu        | Glr        | ) Phe      |
|----|---|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------------|------------|------------|------------|------------|------------|------------|
|    |   | Tyr<br>385 |            | Gly        | Gly        | Pro        | 390        |            | Met        | Ala        | . Glu            | Gln<br>395 |            | Lys        | neA        | Trp        | 400        |
| 10 |   | Pro        | Gly        | Pro        | Суз        | Phe<br>405 |            | Gln        | Gln        | Arg        | Val<br>410       | Ser        | Lys        | Thr        | Leu        | Asp<br>415 | Gln        |
| 15 |   | Asn        | Asn        | Asn        | Ser<br>420 | Asn        | Phe        | Ala        | Trp        | Thr<br>425 | -                | Ala        | Thr        | Lys        | Tyr<br>430 |            | Leu        |
|    |   | Asn        | Xaa        | Arg<br>435 |            | Ser        | Leu        | Val        | Asn<br>440 |            | ely              | Val        | Ala        | Met<br>445 | Ala        | Thr        | His        |
| 20 |   | Lys        | Asp<br>450 | Ąsp        | Glu        | Glu        | Arg        | Phe<br>455 | Phe        | Pro        | Ser              | Ser        | Gly<br>460 | Val        | Leп        | Ile        | Phe        |
| 25 |   | Gly<br>465 | Lys        | Thr        | Gly        | Ala        | Ala<br>470 | Asn        | Lys        | Thr        | Thr              | Leu<br>475 | Glu        | asn        | Val        | Leu        | Met<br>480 |
|    |   | Thr        | Asn        | Glu        | Glu        | Glu<br>485 | Ile        | Arg        | Pro        | Thr        | Asn<br>490       | Pro        | Val        | Ala        | Thr        | Glu<br>495 | Glu        |
| 30 |   | Tyr        | Gly        | Ile        | Val<br>500 | Ser        | Ser        | Asn        | Leu        | Gln<br>505 | Ala              | Ala        | Ser        | Thr        | Ala<br>510 | Ala        | Gln        |
| 35 |   | Thr        | Gln        | Val<br>515 | Val        | Asn        | Asn        | Gln        | Gly<br>520 | Ala        | Leu              | Pro        | Gly        | Met<br>525 | Val        | Trp        | Gln        |
|    |   | Asn        | Arg<br>530 | Asp        | Val        | Tyr        | Leu        | Gln<br>535 | Gly        | Pro        | Ile              | Trp        | Ala<br>540 | Lys        | Ile        | Pro        | His        |
| 40 |   | Thr<br>545 | qeA        | Gly        | Asn        | Phe        | His<br>550 | Pro        | Ser        | Pro        | Leu              | Met<br>555 | Gly        | Gly        | Phe        | Gly        | Leu<br>560 |
| 45 |   | Lys        | His        | Pro        | Pro        | Pro<br>565 | Gln        | Ile        | Leu        | Ile        | Lys<br>570       | Asn        | Thr        | Pro        | Val        | Pro<br>575 | Ala        |
|    | • | Asn        | Pro        | Pro        | Glu<br>580 | Val        | Phe        | Thr        | Pro        | Ala<br>585 | Lys              | Phe        | Ala        | Ser        | Phe<br>590 | Ile        | Thr        |
| 50 |   |            | Tyr        | Ser<br>595 | Thr        | Gly        | Gln        | Val        | Ser<br>600 | Val        | Glu              | Ile        | Glu        | Trp<br>605 | Glu        | Leu        | Gln        |
| 55 |   | Lys        | Glu<br>610 | Asn        | Ser        | Lys        | Arg        | Trp<br>615 | neA        | Pro        | Glu <sub>,</sub> |            | Gln<br>620 | Tyr        | Thr        | Ser        | neA        |

| 5  |                                                  | Phe<br>625 |            | Lys        | Gln        | Thr        | 630        |            | qeA .             | Phe        | Ala        | Val<br>635 |            | Ser        | Gln        | Gly        | Val<br>640 |
|----|--------------------------------------------------|------------|------------|------------|------------|------------|------------|------------|-------------------|------------|------------|------------|------------|------------|------------|------------|------------|
|    |                                                  | Tyr        | Ser        | Glu        | Pro        |            |            |            |                   |            |            |            |            |            |            |            |            |
| 10 | <210> 76<br><211> 644<br><212> PRT<br><213> caps | id pro     | tein of    | f AAV      | seroty     | ype, ci    | one 2      | 23.2       |                   |            |            |            |            |            |            |            | `          |
| 15 | <400> 76                                         |            |            |            | ·.         |            |            |            |                   |            |            |            |            |            |            |            |            |
|    |                                                  | Lys<br>1   | Ala        | Tyr        | qeA        | Gln<br>5   | Gln        | Leu        | Lys               | Ala        | Gly<br>10  | Asp        | neA        | Pro        | Tyr        | Leu<br>15  | Arg        |
| 20 |                                                  | Tyr        | Asn        | His        | Ala<br>20  | Asp        | Ala        | Glu        | Phe               | Gln<br>25  | Glu        | Суз        | Leu        | Gln        | Glu<br>30  | Asp        | Thr        |
| 25 |                                                  | Ser        | Phe        | Gly<br>35  | Gly        | Asn        | Leu        | Gly        | Arg<br>40         | Ala        | Val        | Phe        | Gln        | Ala<br>45  | Lys        | Lys        | Arg        |
|    |                                                  | Val        | Leu<br>50  | Glu        | Pro        | Leu        | Gly        | Leu<br>55  | Val               | Glu        | Thr        | Pro        | Ala<br>60  | Lys        | Thr        | Ala        | Pro        |
| 30 |                                                  | Gly<br>65  | Lys        | Lys        | Arg        | Pro        | Val<br>70  | Asp        | Ser               | Pro        | Asp        | Ser<br>75  | Thr        | Ser        | Gly        | Ile        | 80<br>GJA  |
| 35 |                                                  | Lys        | Lys        | сlу        | Gln        | Gln<br>85  | Pro        | Ala        | Lys               | Lys        | Arg<br>90  | Leu        | Asn        | Phe        | Gly        | Gln<br>95  | Thr        |
|    |                                                  | Gly        | qzA        | ser        | Glu<br>100 | Ser        | Val        | Pro        | Asp               | Pro<br>105 | Gln        | Pro        | Ile        | Gly        | Glu<br>110 | Pro        | Pro        |
| 40 |                                                  | Ala        | Gly        | Pro<br>115 | Ser        | Gly        | Leu        | Gly        | <b>Ser</b><br>120 | Gly        | Thr        | Met        | Val        | Ala<br>125 | GЈĀ        | Gly        | Gly        |
| 45 |                                                  | Ala        | Pro<br>130 | Met        | Ala        | Asp        | Asn        | Asn<br>135 | Glu               | G] À       | Ala        | qeA        | Gly<br>140 | Val        | €ĵλ į      | Asn        | Ala        |
|    |                                                  | Ser<br>145 | eĵy        | Asn        | Trp        | His        | Суз<br>150 | Asp        | Ser               | Thr        | Trp        | Leu<br>155 | Gly        | qeA        | Arg        | Val        | Ile<br>160 |
| 50 |                                                  | Thr        | Thr        | Ser        | Thr        | Arg<br>165 | Thr        | Trp        | Ala               | Leu        | Pro<br>170 | Thr        | Tyr        | Asn        | Asn        | His<br>175 | Leu        |
| 55 | ,                                                | Tyr        | Lys        | Gln        | Ile<br>180 | Ser        | Ser        | Gln        | Ser               | Ala<br>185 | Gly        | ser        | Thr        | neA        | Asp<br>190 | Asn        | Val        |
| 55 |                                                  | Tyr        |            | Gly<br>195 | Tyr        | Ser        | Thr        | Pro        | Trp<br>200        | Gly        | Tyr        | Phe        | qeA        | Phe<br>205 | Asn        | Arg        | Phe        |

| 5               | Hi         | s Cy:<br>21 | s His        | Phe        | e Sei      | r Pro      | 21:        |            | Tr         | Glr          | Arg        | 220        |            | e Asr      | ıeA ı      | n Asn      |
|-----------------|------------|-------------|--------------|------------|------------|------------|------------|------------|------------|--------------|------------|------------|------------|------------|------------|------------|
| ,               | Tr]<br>22: | p Gly       | y Phe        | Arg        | Pro        | 230        | Lys        | . Leu      | Asr        | Phe          | Lys<br>235 |            | Phe        | e Asr      | ı Ile      | 6ln<br>240 |
| 10              | Val        | l Lys       | s Glu        | Val        | Thr<br>245 |            | Asr        | deA        | Gly        | / Val<br>250 |            | Thr        | : Ile      | Ala        | Asn<br>255 | aeA .      |
| 15              | Let        | ı Thr       | : Ser        | Thr<br>260 | Val        | . Gln      | Val        | Phe        | Ser<br>265 |              | Ser        | Glu        | Tyr        | Gln<br>270 |            | Pro        |
|                 | Туг        | . Val       | . Leu<br>275 | Gly        | Ser        | : Ala      | His        | Gln<br>280 | Gly        | Суз          | Leu        | Pro        | Pro<br>285 |            | Pro        | Ala        |
| 20              | qeA        | Val<br>290  | Phe          | Met        | Ile        | Pro        | Gln<br>295 |            | Gly        | Tyr          | Leu        | Thr<br>300 | Leu        | aeA        | Asn        | Gly        |
| 25 <sub>,</sub> | Ser<br>305 | Gln         | Ser          | Val        | Gly        | Arg<br>310 | Ser        | Ser        | Phe        | Tyr          | Cys<br>315 | Leu        | Glu        | Tyr        | Phe        | Pro<br>320 |
| -               |            |             |              |            | 325        |            |            |            |            | 330          |            |            |            |            | 335        |            |
| 30              |            |             |              | 340        |            | His        |            |            | 345        |              |            |            |            | 350        |            |            |
| 35              |            |             | 355          |            |            | Leu        |            | 360        |            |              |            |            | 365        |            |            | -          |
|                 |            | 370         |              |            |            | Gly        | 375        |            |            |              |            | 380        |            |            |            |            |
| 40              | Tyr<br>385 | Gln         | ely          | Gly        | Pro        | Thr<br>390 | Thr        | Met        | Ala        | Glu          | Gln<br>395 | Ala        | Lys        | Asn        | Trp        | Leu<br>400 |
| 45              | Pro        | Gly         | Pro          | Cys        | Phe<br>405 | Arg        | Gln        | Gln        | Arg        | Val<br>410   | Ser        | Lys        | Thr        | Leu        | Asp<br>415 | Gln        |
|                 | Asn        | Asn         | Asn          | Ser<br>420 | Asn        | Phe        | Ala        |            | Thr<br>425 | Gly          | <b>Ala</b> | Thr        | Lys        | Tyr<br>430 | His        | Leu        |
| 50              | neA        | Gly         | Arg<br>435   | neA        | Ser        | Leu        | Val        | Asn<br>440 | Pro        | Gly          | Val :      |            | Met<br>445 | Ala        | Thr        | His        |
| 55              |            | Asp<br>450  | Asp          | Glu        | Glu        |            | Phe<br>455 | Ser        | Pro        | Ser          |            | Gly<br>460 | Val        | Leu        | Ile        | Phe .      |

| 5  |                                                 | 465        |            | Thr               | . elà      | Ala        | 470        |            | . Lys      | Thr        | Thr        | 475                        |            | . Asr      | ı Val      | . Leu      | 480        |
|----|-------------------------------------------------|------------|------------|-------------------|------------|------------|------------|------------|------------|------------|------------|----------------------------|------------|------------|------------|------------|------------|
|    |                                                 | Thr        | : Asn      | Glu               | Glu        | Glu<br>485 |            | Arg        | Pro        | Thr        | Asn<br>490 |                            | Val        | Ala        | Thr        | Glu<br>495 | Glu        |
| 10 |                                                 | Tyr        | Gly        | Ile               | Val<br>500 |            | Ser        | Asn        | Leu        | Gln<br>505 |            | Ala                        | Ser        | Thr        | Ala<br>510 |            | Gln        |
| 15 |                                                 | Thr        | Gln        | <b>Val</b><br>515 |            | neA        | Asn        | Gln        | Gly<br>520 |            | Leu        | Pro                        | Gly        | Met<br>525 |            | Trp        | Gln        |
|    |                                                 | Asn        | Arg<br>530 |                   | Val        | Tyr        | Leu        | Gln<br>535 | Gly        | Pro        | Ile        | Trp                        | Ala<br>540 | Lys        | Ile        | Pro        | His        |
| 20 |                                                 | Thr<br>545 | Asp        | Gly               | Asn        | Phe        | His<br>550 | Pro        | Ser        | Pro        | Leu        | <b>M</b> et<br><b>5</b> 55 | Gly        | Gly        | Phe        | Gly        | Leu<br>560 |
| 25 |                                                 | Lys        | His        | Pro               | Pro        | Pro<br>565 | Gln        | Ile        | Leu        | Ile        | Lys<br>570 | Asn                        | Thr        | Pro        | Val        | Pro<br>575 | Ala        |
|    |                                                 | Asn        | Pro        | Pro               | Glu<br>580 | Val        | Phe        | Thr        | Pro        | Ala<br>585 | Lys        | Phe                        | Ala        | Ser        | Phe<br>590 | Ile        | Thr        |
| 30 |                                                 | Gln        | Tyr        | Ser<br>595        | Thr        | Gly        | Gln        | Val        | Ser<br>600 | Val        | Glu        | Ile                        | Glu        | Trp<br>605 | Glu        | Leu        | Gln        |
| 35 |                                                 | Lys        | Glu<br>610 | Asn               | Ser        | Lys        | Arg        | Trp<br>615 | Asn        | Pro        | G1u        | Ile                        | Gln<br>620 | Tyr        | Thr        | Ser        | Asn        |
|    |                                                 | Phe<br>625 | Asp        | Lys               | Gln        | Thr        | Gly<br>630 | Val        | Asp        | Phe        | Ala        | <b>V</b> al<br><b>6</b> 35 | Asp        | Ser        | Gln        | Gly        | Val<br>640 |
| 40 |                                                 | Tyr        | Ser        | Glu               | Pro        |            |            |            |            |            |            |                            |            |            |            |            |            |
| 45 | <210> 77<br><211> 644<br><212> PR7<br><213> cap | Γ          | otein o    | f AAV             | serot      | ype, c     | lone 2     | 23.7       |            |            |            |                            |            |            |            |            |            |
| 50 | <400> 77                                        |            |            |                   |            |            |            |            | •          |            |            |                            |            |            |            |            |            |
| 50 |                                                 | Lys<br>1   | Ala        | Tyr               | ĄsĄ        | Gln<br>5   | Gln        | Leu        | Lys        | Ala        | Gly<br>10  | Asp                        | Asn        | Pro        | Tyr        | Leu<br>15  | Arg        |
| 55 |                                                 | Tyr        | Asn        | His               | Ala<br>20  | Asp        | Ala        | Glu        | Phe        | Gln<br>25  | Glu        | Arg                        | Leu        | Gln        | Glu<br>30  | qeA        | Thr        |

| 5         | Se                    | r Phe      | • Gly<br>35 | , el?      | / Asi      | n Lei      | ı Gl        | 40         | 3 Ala      | a Vaj      | l Phe       | : Gl:      | n Ala<br>45 | a Ly:      | s Ly:       | a Arg      |
|-----------|-----------------------|------------|-------------|------------|------------|------------|-------------|------------|------------|------------|-------------|------------|-------------|------------|-------------|------------|
|           | Val                   | Lev<br>50  | ı Glu       | Pro        | Let        | r el?      | , Leu<br>55 | val        | Glu        | Thr        | Pro         | 60         | a Ly:       | Thi        | Ala         | Pro        |
| 10        | Gl <sub>)</sub><br>65 | , FÀ       | Lys         | Arg        | Pro        | 70         | ,<br>Asp    |            | Pro        | Asp        | 9 Ser<br>75 | Th:        | s Se        | : Gly      | , Ile       | Gly<br>BO  |
| 15        | Lys                   | Lys        | Gly         | Gln        | Gln<br>85  | Pro        | Ala         | Lys        | Lys        | Arg<br>90  | Leu         | Asr        | n Phe       | Gly        | / Glr<br>95 | Thr        |
|           | Gly                   | qeA '      | Ser         | Glu<br>100 |            | Val        | Pro         | Asp        | Pro<br>105 |            | Pro         | Ile        | : Gly       | Glu<br>110 |             | Pro        |
| 20        | Ala                   | Gly        | Pro<br>115  | Ser        | GJŸ        | Leu        | Gly         | Ser<br>120 |            | Thr        | Met         | Ala        | Ala<br>125  |            | Gly         | Gly        |
| 25        | Ala                   | Pro<br>130 | Met         | Ala        | Ąsp        | Asn        | Asn<br>135  | Glu        | Gly        | Ala        | Asp         | Gly<br>140 |             | Gly        | Asn         | Ala        |
|           | Ser<br>145            |            | Asn         | Trp        | His        | Cys<br>150 | Asp         | Ser        | Thr        | Trp        | Leu<br>155  | Gly        | Asp         | Arg        | <b>Val</b>  | Ile<br>160 |
| 30        | Thr                   | Thr        | Ser         | Thr        | Arg<br>165 | Thr        | Trp         | Ala        | Leu        | Pro<br>170 | Thr         | Tyr        | Asn         | neA        | His<br>175  | Leu        |
| 35        | Tyr                   | Lys        | Gln         | Ile<br>180 | Ser        | Ser        | Gln         | Ser        | Ala<br>185 | Gly        | Ser         | Thr        | Asn         | Asp<br>190 | Asn         | Val        |
|           | Tyr                   | Phe        | Gly<br>195  | Tyr        | Ser        | Thr        | Pro         | Trp<br>200 | Gly        | Tyr        | Phe         | Asp        | Phe<br>205  | neA        | Arg         | Phe        |
| 40        | His                   | Cys<br>210 | His         | Phe        | Ser        | Pro        | Arg<br>215  | qeA        | Trp        | Gln        | Arg         | Leu<br>220 | Ile         | Asn        | Asn         | Asn        |
| <b>45</b> | Trp<br>225            | Gly        | Phe         | Arg        | Pro        | Lys<br>230 |             |            |            |            | Lys<br>235  |            | Phe         | neA        | Ile         | Gln<br>240 |
| 40        | Val                   | Lys        | Glu         | Val        | Thr<br>245 | Thr        | neA         | qeA        | Gly        | Val<br>250 | Thr         | Thr        | Ile         | Ala        | Asn<br>255  | Asn        |
| 50        | Leu                   | Thr        | Ser         | Thr<br>260 | Val        | Gln        | Val         | Phe        | ser<br>265 | Ąsp        | Pro         | Glu        | Tyr         | Gln<br>270 | Leu         | Pro        |
|           | Tyr                   | Val        | Leu<br>275  | Gly        | Ser        | Ala        | His         | Gln<br>280 | Gly        | Cys        | Leu         | Pro        | Pro<br>285  | Phe        | Pro         | Ala        |
|           |                       |            |             |            |            |            |             |            |            |            |             |            |             |            |             |            |

|          | As         | p Va<br>29 | 1 Ph<br>0  | e Me         | t Il       | e Pr       | o G1<br>29   | n Ty<br>5    | r Gl         | <b>y</b> Ty | r Le       | и Тh<br>30   |            | teA u        | n As       | n Gly        |
|----------|------------|------------|------------|--------------|------------|------------|--------------|--------------|--------------|-------------|------------|--------------|------------|--------------|------------|--------------|
| 5        | Se<br>30   | r Gl<br>5  | n Se       | r Va         | 1 G1       | y Ar<br>31 | g Se<br>O    | r Se         | r Ph         | е Ту        | r Cy<br>31 |              | u Gl       | u Ty         | c Ph       | e Pro<br>320 |
| 10       | Se         | r Gl       | n Mei      | t Le         | 325        | Th:        | r Gl         | у Аз         | n As         | n Ph<br>33  |            | r Pho        | e Se:      | r Tyi        | Th.        | r Phe<br>5   |
|          | Gli        | n Yai      | o Val      | 1 Pro<br>340 | Phe        | Hi:        | s Se         | r Se         | т Ту:<br>34! | r Ala       | a His      | s Sei        | Glr        | 350          |            | qeA ı        |
| 15       | Arg        | g Let      | 355        | Asr          | Pro        | Lev        | ı Ile        | e Ası<br>360 | o Gli        | а Туј       | Let        | туг          | Tyr<br>365 |              | Ala        | a Arg        |
| 20       | Thr        | Glm<br>370 | ser        | : Asn        | Ala        | Gly        | , Gly<br>375 | Thr          | Ala          | , Gly       | / Asn      | Arg<br>380   |            | Leu          | Glr        | Phe          |
| 25       | Tyr<br>385 | Gln        | Gly        | Gly          | Pro        | Thr<br>390 | Thr          | Met          | : Ala        | . Glu       | Gln<br>395 |              | Lya        | Asn          | Trp        | Leu<br>400   |
|          | Pro        | Gly        | Pro        | Суз          | Phe<br>405 | Arg        | Gln          | . Gln        | Arg          | Val<br>410  | Ser        | Lys          | Thr        | Leu          | Asp<br>415 | Gln          |
| 30       | Asn        | Asn        | Asn        | Ser<br>420   | neA        | Phe        | Ala          | Trp          | Thr<br>425   | Gly         | Ala        | Thr          | Lys        | Tyr<br>430   | His        | Leu          |
| 35       | Asn        | Gly        | Arg<br>435 | Asn          | Ser        | Leu        | Val          | Asn<br>440   | Pro          | GŢĀ         | Val        | Ala          | Met<br>445 | Ala          | Thr        | His          |
| <u>.</u> | Lys        | Азр<br>450 | Asp        | Glu          | Glu        | Arg        | Phe<br>455   | Phe          | Pro          | Ser         | Ser        | Gly<br>460   | Val        | Leu          | Ile        | Phe          |
| 40       | Gly<br>465 | Lys        | Thr        | Gly          | Ala        | Ala<br>470 | Asn          | Lys          | Thr          | Thr         | Leu<br>475 | Glu          | Asn        | Val          | Leu        | Met<br>480   |
| 45       | Thr        | Asn        | Glu        | Glu          | Glu<br>485 | Ile        | Arg          | Pro          | Thr          | Asn<br>490  | Pro        | Val          | Ala        | Thr          | Glu<br>495 | Glu          |
| +3       | Tyr        | Gly        | Ile        | Val<br>500   | Ser        | Ser        | aeA          | Leu          | Gln<br>505   | Ala         | Ala        | Ser          | Thr        | Ala :<br>510 | Ala        | Gln          |
| 50       | Thr        | Gln        | Val<br>515 | Val          | Asn .      | Asn        | Gln          | Gly<br>520   | Ala          | Leu         | Pro        |              | Met<br>525 | Val '        | Trp        | Gln          |
| 55       | Asn .      | Arg<br>530 | Asp        | Val '        | Tyr :      | Leu        | Gln<br>535   | Gly          | Pro          | Ile         |            | Ala :<br>540 | Lys        | Ile :        | Pro        | His          |
| 1.7)     |            |            |            |              |            |            |              |              |              |             |            |              |            |              |            |              |

|           |                                              | Th<br>54   | r As<br>5 | p Gl       | y Ası        | n Ph      | e Hi:<br>550 |            | o Se         | r Pr       | o Le               | u Me<br>55 |           | y G1        | y Ph       | e Gl       | y Leu<br>560 |
|-----------|----------------------------------------------|------------|-----------|------------|--------------|-----------|--------------|------------|--------------|------------|--------------------|------------|-----------|-------------|------------|------------|--------------|
| 5         |                                              | Ly         | s Hi      | s Pr       | o Pro        | 56        | o Gli<br>5   | ı II       | e Le         | u Il       | e Ly<br>57         |            | n Th      | r Pr        | o Va       | 1 Pr<br>57 | o Ala<br>5   |
| 10        |                                              | Ası        | n Pr      | o ęr       | 580          | ı Va:     | l Phe        | Th:        | r Pro        | 58         | а <b>L</b> y:<br>5 | s Ile      | e Al      | a Se        | r Ph       |            | e Thr        |
|           |                                              | Glr        | ту        | 595        | Thr          | Gly       | / Gln        | Va.        | 1 Sez<br>600 | Val        | l Gl               | ı Ile      | e Gl      | u Tr<br>60: |            | u Le       | ı Gln        |
| 15        |                                              | Lys        | 610       | ı Ası      | Ser          | Lys       | Arg          | Trp<br>615 | Asr          | Pro        | Glu                | ı Ile      | 62        |             | Thi        | Se:        | c Asn        |
| 20        |                                              | Phe<br>625 | Asp       | Lys        | Gln          | Thr       | 630          | Val        | . Asp        | Phe        | Ala                | Val<br>635 | Ası       | Se:         | Glr        | . Gl       | / Val<br>640 |
|           |                                              | Tyr        | Ser       | Glu        | Pro          |           |              |            |              |            |                    |            |           |             |            |            |              |
| 25        | <210> 78<br><211> 64<br><212> P1<br><213> ca | 44<br>RT   | oroteir   | of AA      | \V ser       | otype     | , clone      | 223.       | 6            |            |                    |            |           |             |            |            |              |
| 30        | <400> 78                                     | 3          |           |            |              |           |              |            |              |            |                    |            |           |             |            |            |              |
| <i>35</i> |                                              | Lys<br>1   | Ala       | Tyr        | Asp          | Gln<br>5  | Gln          | Leu        | ĻĻys         | Ala        | Gly<br>10          | Asp        | Asn       | Pro         | Tyr        | Leu<br>15  | Arg          |
|           | ٠                                            | Tyr        | neA       | His        | Ala<br>20    | Asp       | Ala          | Glu        | Phe          | Gln<br>25  | Glu                | Arg        | Leu       | Gln         | Glu<br>30  | Asp        | Thr          |
| 40        |                                              | Ser        | Phe       | Gly<br>35  | Gly          | Asn       | Leu          | Gly        | Arg<br>40    | Ala        | Val                | Phe        | Gln       | Ala<br>45   | Lys        | Lys        | Arg          |
| 45        |                                              | Val        | Leu<br>50 | Glu        | Pro          | Leu       | Gly          | Leu<br>55  | Val          | Glu        | Thr                | Pro        | Ala<br>60 | Lys         | Thr        | Ala        | Pro          |
|           |                                              | Gly<br>65  | Lys       | Lys        | Arg          | Pro       | Val<br>70    | Asp        | Ser          | Pro        | qeA                | Ser<br>75  | Thr       | Ser         | Gly        | Ile        | Gly<br>80    |
| 50        |                                              | Lys        | Lys       | Gly        | Gln (        | Gln<br>85 | Pro .        | Ala        | Lys          | Lys        | Arg<br>90          | Leu        | Asn       | Phe         | Gly        | Gln<br>95  | Thr          |
| 55        |                                              | Gly        | Asp       | Ser        | Glu :<br>100 | Ser       | Val          | Pro        |              | Pro<br>105 | Gln                | Pro        | Ile       | Gly         | Glu<br>110 | Pro        | Pro          |
|           |                                              | Ala        | Gly       | Pro<br>115 | Ser (        | Sly :     | Leu (        | 3ly        | Ser (        | Gly        | Thr                | Met .      | Ala       | Ala<br>125  | Gly        | Gly        | Gly          |

| _         | Ala        | 130        |            | : Ala      | Asp              | ) Asr      | Ser<br>135 |            | ı Gly      | / Ala      | a Asp      | G13<br>140 |            | l Gl       | / Asr      | n Ala      |
|-----------|------------|------------|------------|------------|------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| 5         | Ser<br>145 |            | / Asn      | Tr         | His              | Cys<br>150 | -          | Ser        | Thr        | Trp        | 155        | _          | / Asp      | ) Arg      | , Val      | Ile<br>160 |
| 10 .      | Thr        | Thr        | : Ser      | Thr        | Arg<br>165       |            | Trp        | Ala        | Leu        | Pro<br>170 |            | Туг        | : Asr      | . Asr      | His<br>175 | Leu        |
| 15        | Tyr        | Lys        | Gln        | Ile<br>180 |                  | Ser        | Gln        | Ser        | Ala<br>185 |            | Ser        | Thr        | : Asn      | Asp<br>190 |            | Val        |
|           | Tyr        | Phe        | Gly<br>195 |            | Ser              | Thr        | Pro        | Trp<br>200 |            | Tyr        | Phe        | Asp        | Phe<br>205 |            | . Arg      | Phe        |
| 20        | His        | Суз<br>210 |            | Phe        | Ser              | Pro        | Arg<br>215 | Asp        | Trp        | Gln        | Arg        | Leu<br>220 |            | Asn        | neA.       | Asn        |
| <b>25</b> | Trp<br>225 | Gly        | Phe        | Arg        | Pro              | Lys<br>230 | Lys        | Leu        | Asn        | Phe        | Lys<br>235 | Leu        | Phe        | Asn        | Ile        | Gln<br>240 |
|           | Val        | Lys        | Glu        | Val        | Thr<br>245       | Thr        | Asn        | Asp        | Gly        | Val<br>250 | Thr        | Thr        |            | Ala        | Asn<br>255 | Asn        |
|           | Leu        | Thr        | Ser        | Thr<br>260 | Val              | Gln        | Val        | Phe        | Ser<br>265 | Asp        | Ser        | Glu        | Tyr        | Gln<br>270 | Leu        | Pro        |
| <i>35</i> | Tyr        | Val        | Leu<br>275 | Gly        | Ser              | Ala        | His        | Gln<br>280 | Gly        | Суз        | Leu        | Pro        | Pro<br>285 | Phe        | Pro        | Ala        |
|           | Asp        | Val<br>290 | Phe        | Met        | Ile <sub>.</sub> | Pro        | Gln<br>295 | Tyr        | Gly        | Tyr        | Leu        | Thr<br>300 | Leu        | Asn        | Asn        | Gly        |
| 40        | Ser<br>305 | Gln        | Ser        | Val        | Gly              | Arg<br>310 | Ser        | Ser        | Phe        | туг        | Cys<br>315 | Leu        | Glu        | Tyr        | Phe        | Pro<br>320 |
| 45        | Ser        | Gln        | Met        | Leu        | Arg<br>325       | Thr        | Gly        | Asn        | Asn        | Phe<br>330 | Thr        | Phe        | Ser        | Tyr        | Thr<br>335 | Phe        |
| •         | Glu        | Asp        | Val        | Pro<br>340 | Phe              | His        | Ser        | Ser        | Tyr<br>345 | Ala        | His        | Ser        | Gln        | Ser<br>350 | Leu        | qeA        |
| 50        | Arg        | Leu        | Met<br>355 | Asn        | Pro              | Leu        |            | Asp<br>360 | Gln        | Tyr        | Leu        | Tyr        | Tyr<br>365 | Leu        | Ala        | Arg        |
|           | Thr        | Gln<br>370 | Ser        | Asn        | Ala              | Gly        | Gly<br>375 | Thr        | Ala        | Gly        | Asn        | Arg<br>380 | Glu        | Leu        | Gln        | Phe        |
|           |            |            |            |            |                  |            |            |            |            |            |            |            |            |            |            |            |

|      | Tyr<br>385 |            | Gly        | Gly        | Pro        | Thr<br>390 |            | Met        | Ala        | Glu        | 395        |            | Lys        | Asn        | Trp        | 100        |
|------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| 5    | Pro        | Gly        | Pro        | Суз        | Phe<br>405 | Arg        | Gln        | Gln        | Arg        | Val<br>410 |            | Lys        | Thr        | Leu        | Asp<br>415 |            |
| 10 ' | neA        | Asn        | Asn        | Ser<br>420 | Asn        | Phe        | Ala        | Trp        | Thr<br>425 |            | Ala        | Thr        | Lys        | Tyr<br>430 |            | Leu        |
|      | Asn        | Gly        | Arg<br>435 |            | Ser        | Leu        | Val        | Asn<br>440 | Pro        | Gly        | Val        | Ala        | Met<br>445 | Ala        | Thr        | His        |
| 15   | Lys        | Asp<br>450 | -          | Glu        | Glu        | Arg        | Phe<br>455 | Phe        | Pro        | Ser        | Ser        | Gly<br>460 | Val        | Leu        | Ile        | Phe        |
| 20   | Gly<br>465 | _          | Thr        | Gly        | Ala        | Ala<br>470 | Asn        | Lys        | Thr        | Thr        | Leu<br>475 | Glu        | Asn        | Val        | Leu        | Met<br>480 |
|      | Thr        | Asn        | Glu        | Glu        | Glu<br>485 | Ile        | Arg        | Pro        | Thr        | Asn<br>490 | Pro        | Val        | Ala        | Thr        | Glu<br>495 | Glu        |
|      | Tyr        | Gly        | Ile        | Val<br>500 | Ser        | Ser        | Asn        | Leu        | Gln<br>505 | Ala        | Ala        | Ser        | Thr        | Ala<br>510 | Ala        | Gln        |
| 30   | Thr        | Gln        | Val<br>515 | Val        | Asn        | Asn        | Gln        | Gly<br>520 | Ala        | Leu        | Pro        | Gly        | Met<br>525 | Val        | Trp        | Gln        |
|      | neA        | Arg<br>530 | Asp        | Val        | Tyr        | Leu        | Gln<br>535 | Gly        | Pro        | Ile        | Trp        | Ala<br>540 | Lys        | Ile        | Pro        | His        |
| 35   | Thr<br>545 | qeA        | Gly        | Asn        | Phe        | His<br>550 | Pro        | Ser        | Pro        | Leu        | Met<br>555 | Gly        | Gly        | Phe        | Gly        | Leu<br>560 |
| 40   | Lys        | His        | Pro        | Pro        | Pro<br>565 | Gln        | Ile        | Leu        | Ile        | Lys<br>570 | Asn        | Thr        | Pro        | Val        | Pro<br>575 | Ala        |
|      | Asn        | Pro        | Pro        | Glu<br>580 | Val        | Phe        | Thr        | Pro        | Ala<br>585 | Lys        | Leu        | Ala        | Ser        | Phe<br>590 | Ile        | Thr        |
| 45   | Gln        | Tyr        | Ser<br>595 | Thr        | Gly        | Gln        | Val        | Ser<br>600 | Val        | Glu        | Ile        | Glu        | Trp<br>605 | Glu        | Leu        | Gln        |
| 50 · | Lys        | Glu<br>610 | Asn        | ser        | Lys        | Arg        | Trp<br>615 |            | Pro        | Glu        | Ile        | Gln<br>620 | Tyr        | Thr        | Ser        | Asn        |
| _    | Phe<br>625 | qeA        | Lys        | Gln        | Thr        | Gly<br>630 | Val        | Asp        | Phe        | Ala        | Val<br>635 | qeA        | Ser        | Gln        | Gly        | Val<br>640 |
| 55   |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |

#### Tyr Ser Glu Pro

|    | <210> 79<br><211> 73 |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |
|----|----------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
|    | <212> PR             |            |            |            |            |            |            |            |            |            |            |            | •          |            |            |            |            |
| 10 | <213> car            | osid pi    | rotein     | of AA      | V ser      | otype,     | clone      | 44.1       |            |            |            |            |            |            |            |            |            |
|    | <400> 79             |            |            |            |            |            |            |            |            |            | •          |            |            |            |            |            |            |
| 15 | •                    | Met<br>1   | Ala        | Ala        | Asp        | Gly<br>5   | Tyr        | Leu        | Pro        | Asp        | Trp<br>10  | Leu        | Glu        | Asp        | ne.K       | Leu<br>15  | Ser        |
| 20 |                      | Glu        | Gly        | Ile        | Arg<br>20  | Glu        | Trp        | Trp        | Asp        | Leu<br>25  | Lys        | Pro        | Gly        | Ala        | Pro<br>30  | Lys        | Pro        |
|    |                      | Lys        | Ala        | Asn<br>35  | Gln        | alə        | Lys        | Glz        | Asp<br>40  | Asp        | Gly        | Arg        | Gly        | Leu<br>45  |            | Leu        | Pro        |
| 25 | • • •                |            | Tyr<br>50  | Lys        | Tyr        | Leu        | Gly        | Pro<br>55  | Phe        | Asn        | Gly        | Leu        | Asp<br>60  | Lys        | Gly        | Glu        | Pro        |
| 30 |                      | Val<br>65  | Asn        | Aļa        | Ala        | Asp        | Ala<br>70  | Ala        | Ala        | Leu        | Glu        | His<br>75  | Asp        | Lys        | Ala        | Tyr        | qeA<br>08  |
|    |                      | Gln        | Gln        | Leu        | Lys        | Ala<br>85  | Gly        | Asp        | Asn        | Pro        | Tyr<br>90  | Leu        | Arg        | Tyr        | Asn        | His<br>95  | Ala        |
| 35 |                      | Asp        | Ala        | Glu        | Phe<br>100 | Gln        | Glu        | Arg        | Leu        | Gln<br>105 |            | Asp        | Thr        | Ser        | Phe<br>110 | Gly        | Gly        |
| 40 | •                    | Asn        | Leu        | G1y<br>115 | Arg        | Ala        | Val        | Phe        | Gln<br>120 | Ala        | Lys        | Lys        | Arg        | Val<br>125 | Leu        | Glu        | Pro        |
|    |                      | Leu        | Gly<br>130 | Leu        | Val        | Glu        | Glu        | Gly<br>135 | Ala        | r ya       | Thr        | Ala        | Pro<br>140 | Gly        | Lys        | Lys        | Arg        |
| 45 |                      | Pro<br>145 | Val        | Glu        | Pro        | Ser        | Pro<br>150 | Glp        | Arg        | Ser        | Pro        | Asp<br>155 | Ser        | Ser        | Thr        | Gly        | Ile<br>160 |
| 50 |                      | Gly        | Lys        | Lys        | Gly        | Gln<br>165 | Gln        | Pro        | Ala        | Lys        | Lys<br>170 | Arg        | Leu        | Asn        | Phe        | Gly<br>175 | Gln        |
|    | ·                    | Thr        | Gly        | qeA        | Ser<br>180 | Glu        | ser        | Val        | Pro        | Asp<br>185 | Pro        | Gln        | Pro        | Ile        | Gly<br>190 | Glu        | Pro        |
| 55 |                      | Pro        | Ala        | Gly<br>195 | Pro        | Ser        | Gly        | Leu        | Gly<br>200 | Ser        | Gly        | Thr        | Met        | Ala<br>205 | Ala        | Gly        | Gly        |

|    | e)         | ly Al<br>21 | .a Pr<br>.0  | o Met        | E Ala        | a Ası        | P As:<br>21 | n Ası<br>S | n Gl         | u Gl         | y Ala      | 220        |            | / Val      | . Gl       | / Ser      |
|----|------------|-------------|--------------|--------------|--------------|--------------|-------------|------------|--------------|--------------|------------|------------|------------|------------|------------|------------|
| 5  | S e<br>2 2 | r Se        | r Gl         | y Asr        | ı Tr         | 230          | з Су:<br>)  | s Asy      | o Sei        | r Thi        | 235        |            | Gly        | / Asp      | Arg        | Val<br>240 |
| 10 | Il         | e Th        | r Th         | r Ser        | Thr<br>245   | : Arg        | Th:         | Trp        | Ale          | Leu<br>250   | Pro        | Thr        | Туг        | Asn        | Asn<br>255 | His        |
| 15 | Le         | u Ty        | r Lys        | Gln<br>260   | Ile          | Ser          | neA :       | Gly        | Thr<br>265   | Ser          | Gly        | Gly        | Ser        | Thr<br>270 | Asn        | Asp        |
| 13 | Ası        | n Thi       | Ty:<br>275   | Phe          | Gly          | Tyr          | Ser         | Thr<br>280 | Бřо          | Trp          | Gly        | Tyr        | Phe<br>285 | Asp        | Phe        | Asn        |
| 20 | Arg        | 290         | e His        | Cys          | His          | Phe          | Ser<br>295  | Pro        | Arg          | Asp          | Trp        | Gln<br>300 | Arg        | Leu        | Ile        | Asn        |
| 25 | 305        | Asn         | Trp          | Gly          | Phe          | Arg<br>310   | Pro         | Lys        | Arg          | Leu          | Asn<br>315 | Phe        | Lys        | Leu        | Phe        | Asn<br>320 |
|    | Ile        | : Gln       | .Val         | Lys          | Glu<br>325   | Val          | Thr         | Gln        | Asn          | Glu<br>330   | Gly        | Thr        | Lys        |            | Ile<br>335 | Ala        |
| 30 | neA        | Asn         | Leu          | Thr<br>340   | Ser          | Thr          | Ile         | Gln        | Val<br>345   | Phe          | Thr        | Asp        |            | Glu<br>350 | Tyr        | Gln        |
| 35 | Leu        | Pro         | Tyr<br>355   | Val          | Leu          | Gly          | Ser         | Ala<br>360 | His          | Gln          | Gly        |            | Leu<br>365 | Pro :      | Pro        | Phe        |
| •  | Pro        | Ala<br>370  | Asp          | Val          | Phe          | Met          | Ile<br>375  | Pro        | Gln          | Tyr          | Gly        | Tyr :      | Leu '      | Thr 1      | Leu .      | Asn .      |
| 40 | Asn<br>385 | ely         | Ser          | Gln 1        | Ala '        | Val (<br>390 | Gly .       | Arg :      | Ser :        | Ser :        | Phe :      | Tyr (      | Cys 1      | Leu G      |            | fyr<br>400 |
| 45 | Phe        | Pro         | Ser          | Gln N        | det 1<br>105 | Leu )        | Arg (       | Thr (      | Sly ;        | Asn /<br>410 | Asn 1      | Phe (      | Flu I      | he S       | er 1       | Tyr        |
|    | Gln        | Phe         | Glu .        | Asp \<br>420 | /al: 1       | Pro E        | Phe 1       | His S      | Ser S<br>125 | Ber 1        | Cyr 1      | lla F      |            | er G<br>30 | ln s       | er         |
| 50 | Leu        | Asp         | Arg :<br>435 | Leu M        | iet A        | lsn P        | Pro I       | 140        | le A         | g qe.        | iln T      | yr L<br>4  | eu T<br>45 | yr T       | yr L       | eu         |
| 55 | Ser.       | Arg<br>450  | Thr (        | Gln S        | er T         | hr G         | ly 6        |            |              | la G         |            | hr G<br>60 | ln G       | ln L       | eu L       | eu         |

| _         |     | 4 6 5      |                  | GIN        | Ala        | Gly        | 470        |            | , ASD      | Met        | Ser        | 475               |            | . Ala      | груз       | ASN        | 1rp<br>480        |
|-----------|-----|------------|------------------|------------|------------|------------|------------|------------|------------|------------|------------|-------------------|------------|------------|------------|------------|-------------------|
| 5         |     | Leu        | Pro              | Gly        | Pro        | Cys<br>485 | -          | Arg        | Gln        | Gln        | Arg<br>490 |                   | Ser        | Thr        | Thr        | Leu<br>495 |                   |
| 10        |     | Gln        | neA <sub>.</sub> | neA        | Asn<br>500 |            | Asn        | Phe        | Ala        | Trp<br>505 |            | Gly               | Ala        | Thr        | Lys<br>510 | Туг        | His               |
| 15        |     | Leu        | Asn              | Gly<br>515 | _          | Asp        | Ser        | Leu        | Val<br>520 |            | Pro        | Gly               | Val        | Ala<br>525 |            | Ala        | Thr               |
|           |     | His        | Lys<br>530       |            | Asp        | Glu        | Glu        | Arg<br>535 | Phe        | Phe        | Pro        | Ser               | Ser<br>540 | Gly        | Val        | Leu        | Met               |
| 20        |     | Phe<br>545 | _                | Lys        | Gln        | GJA        | Ala<br>550 | Gly        | Lys        | Asp        | Asn        | <b>Val</b><br>555 | Asp        | Tyr        | Ser        | Ser        | Val<br>560        |
| 25        |     | Met        | Leu              | Thr        | Ser        | Glu<br>565 | Glu        | Glu        | Ile        | Lys        | Thr<br>570 | Thr               | Asn        | Pro        | Val        | Ala<br>575 | Thr               |
| -         |     | Glu        | Gln              | Tyr        | Gly<br>580 | Val        | Val        | Ala        | qzA        | Asn<br>585 | Leu        | Gln               | Gln        | Gln        | Asn<br>590 | Ala        | Ala               |
| 30        |     | Pro        | Ile              | Val<br>595 | ĠŢĀ        | Ala        | Val        | Asn        | Ser<br>600 | Gln        | Gly        | Ala               | Leu        | Pro<br>605 | Gly        | Met        | Val               |
| <b>35</b> |     | Trp        | Gln<br>610       | Asn        | Arg        | Asp        | Val        | Tyr<br>615 | Leu        | Gln        | Gly        | Pro               | Ile<br>620 | Trp        | Ala        | ГÀЗ        | Ile               |
|           |     | Pro<br>625 | His              | Thr        | Asp        | elà        | Asn<br>630 | Phe        | His        | Pro        | Ser        | Pro<br>635        | Leu        | Met        | Gly        | Gly        | Phe<br>640        |
| 40        |     | Gly        | Leu              | Lys        | His        | Pro<br>645 | Pro        | Pro        | Gln        | Ile        | Leu<br>650 | Ile               | Lys        | neA        | Thr        | Pro<br>655 | Val               |
| 45        |     | Pro        | Ala              | Asp        | Pro<br>660 | Pro        | Thr        | Thr        | Phe        | Ser<br>665 | Gln        | Ala               | Lys        | Leu        | Ala<br>670 | Ser        | Phe               |
|           |     | Ile        | Thr              | Gln<br>675 | Tyr        | Ser        | Thr        | Gly        | 680        | Val        | Ser        | Val               | Glu        | Ile<br>685 | Glu        | Trp        | Сſ'n              |
| 50        |     | Leu        | Gln<br>690       | Lys        | Glu        | Asn        | ser        | Lys<br>695 | Arg        | Trp        | Asn        | Pro               | Glu<br>700 | Ile        | Gln        | Tyr        | Thr               |
| <i>55</i> | • • | Ser<br>705 | Asn              | Tyr        | Tyr        | Lys        | Ser<br>710 | Thr        | Asn        | Val        | Asp        | Phe<br>715        | Ala        | Val        | neA        | Thr        | <b>Asp</b><br>720 |

Gly Thr Tyr Ser Glu Pro Arg Pro Ile Gly Thr Arg Tyr Leu Thr Arg 725 730 735

Asn Leu

<210> 80

<211> 738

<212> PRT

<213> capsid protein of AAV serotype, clone 44.5

<400> 80

|           | Met<br>1   | : Ala      | Ala        | Asp        | 61y<br>5   | Tyr        | Lei        | Pro        | Asp                | Trp<br>10  | Leu        | Gl:        | ı Yəi      | eA c       | 15         | Ser        |
|-----------|------------|------------|------------|------------|------------|------------|------------|------------|--------------------|------------|------------|------------|------------|------------|------------|------------|
| 5         | Glu        | Gly        | Ile        | Arg<br>20  | Glu        | Trp        | Trp        | Asp        | Lev<br>25          | ı Lys      | Pro        | GJ)        | / Ala      | Pro<br>30  | ) Lys      | Pro        |
| 10 '      | Lys        | Ala        | Asn<br>35  | Gln        | Gln        | Lys        | Gln        | Asp<br>40  | Asp                | Gly        | Arg        | Gly        | Leu<br>45  | . Val      | Leu        | Pro        |
|           | Gly        | Tyr<br>50  | Lys        | Tyr        | Leu        | Gly        | Pro<br>55  | Phe        | Asn                | Gly        | Leu        | Asp<br>60  | Lys        | Gly        | Glu        | Pro        |
| 15        | Val<br>65  | Asn        | Ala        | Ala        | Asp        | Ala<br>70  | Ala        | Ala        | Leu                | Glu        | His<br>75  | Asp        | Lys        | Ala        | Tyr        | Asp<br>80  |
| 20        | Gln        | Gln        | Leu        | Lys        | Ala<br>85  | Gly        | λsp        | Asn        | Pro                | Tyr<br>90  | Len        | Arg        | Tyr        | Asn        | His<br>95  | Ala        |
|           | Asp        | Ala        | Glu        | Phe<br>100 | Gln        | Glu        | Arg        | Leu        | Gln<br>105         | Glu        | Asp        | Thr        | Ser        | Phe<br>110 | Gly        | Gly        |
| <b>25</b> | Asn        | Leu        | Gly<br>115 | Arg        | Ala        | Val        | Phe        | Gln<br>120 | Ala                | Lys        | Lys        | Arg        | Val<br>125 | Leu        | Glu        | Pro        |
|           | Leu        | Gly<br>130 | Leu        | Val        | Glu        | Glu        | Gly<br>135 | Ala        | Lys                | Thr        | Ala        | Pro<br>140 | Gly        | Lys        | Lys        | Arg        |
|           | Pro<br>145 | Val        | Glu        | Pro        | Ser        | Pro<br>150 | Gln        | Arg        | Ser                | Pro        | Asp<br>155 | Ser        | Ser        | Thr        | Gly        | Ile<br>160 |
| 35        | Gly        | Lys        | Lys        | Gly        | Gln<br>165 | Gln        | Pro        | Ala        | Lуз                | Lys<br>170 | Arg        | Leu        | Asn        | Phe        | Gly<br>175 | Gln        |
| 40        | Thr        | Gly        | Asp        | Ser<br>180 | Glu        | Ser        | Val        | Pro        | <b>As</b> p<br>185 | Pro        | Gln        | Pro        | Ile        | Gly<br>190 | Glu        | Pro        |
|           | Pro .      | Ala        | Gly<br>195 | Pro        | Ser        | Gly        | Leu        | Gly<br>200 | Ser                | Gly        | Thr        | Met        | Ala<br>205 | Ala        | Gly        | Gly        |
| 15        |            |            |            |            |            |            |            |            |                    |            |            |            |            |            |            |            |

|    |   | G)         | ly Al<br>21  | la Pr<br>10  | o Me         | t Al       | .a As        | p As<br>21   | n As<br>5    | n Gl        | u Gl                    | y Al       | a As<br>22 |              | y Va       | 1 G1         | y Ser        |
|----|---|------------|--------------|--------------|--------------|------------|--------------|--------------|--------------|-------------|-------------------------|------------|------------|--------------|------------|--------------|--------------|
| 5  |   | S e<br>22  | er Se        | er Gl        | y As         | n Tr       | р Ні<br>23   | s Cy<br>0    | s As         | p Se        | r Th                    | r Tr<br>23 | p Le       | u Gl         | y As       | p Ar         | g Val<br>240 |
| 10 | , | II         | e Th         | r Th         | r Se         | Th. 24     | r Ar<br>5    | g Thi        | r Tr         | p Al        | a Le <sup>-</sup><br>25 | u Pro      | Th:        | т Ту         | r As       | n As:<br>25: | n His<br>5   |
|    |   | Le         | u Ty         | r Ly         | s Glr<br>260 | n Ile      | e Se:        | r Ası        | o Gly        | y Th:<br>26 | r Se:<br>5              | r Gly      | / Gl       | y Sez        | Th:        |              | n Asp        |
| 15 |   | As         | n Th         | r Ty:<br>27: | r Phe<br>5   | E13        | у Туі        | s Ser        | Thr<br>280   | Pro         | Tr                      | o Gly      | туг        | Phe 285      |            | Phe          | neA é        |
| 20 |   | Ar         | g Pho<br>290 | e His        | s Cys        | His        | Phe          | ser<br>295   | Pro          | Arg         | Asp                     | Trp        | Gln<br>300 |              | Leu        | Ile          | e Asn        |
|    |   | As:<br>305 | n Asr<br>5   | ı Trp        | Gly          | Phe        | : Arg<br>310 | Pro          | Lys          | Arg         | Pro                     | Asn<br>315 | Phe        | Lys          | Leu        | Phe          | Asn<br>320   |
| 25 |   | Ile        | e Glr        | val          | . Lys        | Glu<br>325 | Val          | Thr          | Gln          | Asn         | Glu<br>330              | Gly        | The        | Lys          | Thr        | Ile<br>335   | Ala          |
| 30 |   | Asn        | ı Asn        | Leu          | Thr<br>340   | Ser        | Thr          | Ile          | Gln          | Val<br>345  | Phe                     | Thr        | qeA        | Ser          | Glu<br>350 |              | Gln          |
| 95 |   | Leu        | Pro          | Tyr<br>355   | Val          | Leu        | Gly          | Ser          | Ala<br>360   | His         | Gln                     | Gly        | Суз        | Leu<br>365   | Pro        | Pro          | Phe          |
| 35 |   | Pro        | Ala<br>370   | Asp          | Val          | Phe        | Met          | Ile<br>375   | Pro          | Gln         | Tyr                     | Gly        | Туг<br>380 | Leu          | Thr        | Leu          | Asn          |
| 40 |   | Asn<br>385 | Gly          | Ser          | Gln          | Ala        | Val<br>390   | ely          | Arg          | Ser         | Ser                     | Phe<br>395 | Tyr        | Cys          | Leu        | .Glu         | Tyr<br>400   |
| 45 |   | Phe        | Pro          | Ser          | Gln          | Met<br>405 | Leu          | Arg          | Thr          | Gly         | Asn<br>410              | Asn        | Phe        | Glu          | Phe        | Ser<br>415   | Tyr          |
| 45 |   | Gln        | Phe          | Glu          | Asp<br>420   | Val        | Pro          | Phe          | His          | Ser<br>425  | Ser                     | Tyr .      | Ala        | His          | Ser<br>430 | Gln          | Ser          |
| 50 |   | Leu        | Ąsp          | Arg<br>435   | Leu 1        | Met        | Asn          | Pro :        | Leu :<br>440 | Ile .       | Asp                     | Gln '      |            | Leu '<br>445 | Tyr        | Tyr          | Leu          |
| 55 | , | Ser        | Arg<br>450   | Thr          | Gln :        | ser        | Thr          | Gly (<br>455 | Gly '        | Thr :       | Ala                     |            | Thr        | Gln (        | Gln        | Leu :        | Leu          |
|    |   |            |              |              |              |            |              |              |              |             |                         |            |            |              |            |              |              |

|    | P)          | ne Se<br>55 | er G]      | Ln Al        | a Gl       | 47           | о Аз<br>'0   | n As              | n Me       | t Se       | r Al<br>47 | a G1<br>5  | n Al        | a Ly       | s As         | n Trp<br>480      |
|----|-------------|-------------|------------|--------------|------------|--------------|--------------|-------------------|------------|------------|------------|------------|-------------|------------|--------------|-------------------|
| 5  | Le          | eu Pr       | :0 G1      | y Pr         | o Cy<br>48 | 's Ty<br> 5  | r Ar         | g Gl              | n Gl       | n Ar<br>49 | g Va.<br>O | l Se       | r Th        | r Th       | r Le<br>49   | u Ser<br>5        |
| 10 | <u>,</u> 61 | eA n.       | n As       | n As<br>50   | n Se<br>O  | r As         | n Ph         | e Ala             | 50         | p Th       | r Gl       | y Al       | a' Th       | r Ly<br>51 |              | r His             |
|    | Le          | eA D        | n Gl<br>51 | y Ar<br>5    | g As       | p Se         | r Lei        | u Val<br>520      | L Ası      | n Pro      | Gly        | y Va       | 1 Ala<br>52 |            | t Al         | a Thr             |
| 15 | Hi          | s Ly.<br>53 | s As;<br>0 | eA q         | p Gl       | u Gli        | 1 Arg<br>535 | y Phe             | Phe        | e Pro      | Ser        | 540        |             | y Va       | l Lei        | ı Met             |
| 20 | Ph<br>54    | e Gly<br>5  | y Ly:      | 3 Gli        | a Gly      | y Ala<br>550 | a Gly        | / Lys             | Asp        | Asn        | Val<br>555 | , Ası      | Туг         | : Sei      | : Se         | Val<br>560        |
| 25 | Met         | t Lev       | l Thi      | s Sei        | 61v<br>565 | ı Glu        | Glu          | lle               | Lys        | Thr<br>570 | Thr        | Asn<br>,   | Pro         | Val        | . Ale<br>575 | Thr               |
|    | Gli         | ı Glr       | Tyr        | : Gly<br>580 | Val        | . Val        | Ala          | Asp               | Asn<br>585 | Leu        | Gln        | Gln        | Gln         | Asn<br>590 |              | Ala               |
| 30 | Pro         | ) Ile       | Val<br>595 | Gly          | Ala        | Val          | Asn          | Ser<br>600        | Gln        | Gly        | Ala        | Leu        | Pro<br>605  | Gly        | Met          | Val               |
| 25 | Trp         | Gln<br>610  | . Asn      | Arg          | qeA        | Val          | Tyr<br>615   | Leu               | Gln        | Gly        | Pro        | Ile<br>620 | Trp         | Ala        | Lys          | Ile               |
| 35 | Pro<br>625  | His         | Thr        | Asp          | Gly        | Asn<br>630   | Phe          | His               | Pro        | Ser        | Pro<br>635 | Leu        | Met         | Gly        | Gly          | Phe<br>640        |
| 40 | Gly         | Leu         | Lys        | His          | Pro<br>645 | Pro          | Pro          | Gln               | Ile        | Leu<br>650 | Ile        | Lys        | Asn         | Thr        | Pro<br>655   | Val               |
| 45 | Pro         | Ala         | qeA        | Pro<br>660   | Pro        | Thr          | Thr          | Phe               | Ser<br>665 | Gln        | Ala        | Lys        | Leu         | Ala<br>670 | Ser          | Phe               |
|    | Ile         | Thr         | Gln<br>675 | Tyr          | Ser        | Thr          | Gly          | <b>Gln</b><br>680 | Val        | Ser        | Val        | Glu        | Ile<br>685  | Glu        | Trp          | Glu               |
| 50 | Leu         | Gln<br>690  | Lys        | Glu          | neA        | Ser          | Lys<br>695   | Arg               | Trp        | Asn        |            | Glu<br>700 | Ile         | Gln        | Tyr          | Thr               |
|    | Ser<br>705  | Asn         | Tyr        | Tyr          | Lys        | Ser<br>710   | Thr .        | Asn '             | Val .      | qeA        | Phe 1715   | Ala        | Val .       | Asn        | Thr          | <b>Asp</b><br>720 |
|    |             |             |            |              |            |              |              |                   |            |            |            |            |             |            |              |                   |

Gly Thr Tyr Ser Glu Pro Arg Pro Ile Gly Thr Arg Tyr Leu Thr Arg 725 730 735

| 5  | Asn Leu                                                                                |  |
|----|----------------------------------------------------------------------------------------|--|
| 10 | <210> 81<br><211> 738<br><212> PRT<br><213> capsid protein of AAV serotype, clone 44.2 |  |
| 15 | <400> 81                                                                               |  |
| 20 |                                                                                        |  |
| 25 |                                                                                        |  |
| 30 |                                                                                        |  |
| 35 |                                                                                        |  |
| 40 |                                                                                        |  |
| 45 |                                                                                        |  |
| 50 |                                                                                        |  |
| 55 |                                                                                        |  |

|    | Met<br>1   | t Ala       | a Ala      | a Asp      | 61 y<br>5  | ту:        | c Lei      | ı Pro       | As <sub>l</sub> | P Tr]<br>10 | p Let      | a Gli      | ı Ası      | p Ası      | n Le       | u Ser      |
|----|------------|-------------|------------|------------|------------|------------|------------|-------------|-----------------|-------------|------------|------------|------------|------------|------------|------------|
| 5  | Gli        | ī GļŽ       | / Ile      | Arg<br>20  | Glu        | Trp        | Trp        | Asp         | Let<br>25       | ı Ly:       | Pro        | ely        | / Ala      | a Pro      | Ly:        | s Pro      |
| 10 | Lys        | Ala         | 35         | Gln        | Gln        | Lys        | Gln        | Asp<br>40   | zeA o           | Gly         | / Arg      | l eJ?      | Leu<br>45  | ı Val      | L Le       | ı Pro      |
|    | Gly        | 7 Tyr<br>50 | Lys        | Tyr        | Leu        | e1 y       | Pro<br>SS  | Phe         | . Asn           | Gly         | Leu        | Asp<br>60  | Lys        | Gly        | Glu        | Pro        |
| 15 | Val<br>65  | . Asn       | Ala        | Ala        | Asp        | Ala<br>70  | Ala        | Ala         | Leu             | Glu         | His<br>75  | Asp        | Lys        | Ala        | Туг        | qeA<br>08  |
| 20 | Gln        | Gln         | Leu        | Lys        | Ala<br>85  | Gly        | Asp        | Asn         | Pro             | туг<br>90   | Leu        | Arg        | Tyr        | Asn        | His<br>95  | Ala        |
|    | Ąsp        | Ala         | Glu        | Phe<br>100 | Gln        | Glu        | Arg        | Leu         | Gln<br>105      | Glu         | Asp        | Thr        | Ser        | Phe<br>110 | Gly        | Gly        |
| 25 | Asn        | Leu         | Gly<br>115 | Arg        | Ala        | Val        | Phe        | Gln<br>120  | Ala             | Lys         | Lys        | Arg        | Val<br>125 | Leu        | Glu        | Pro        |
| 30 | Leu        | Gly<br>130  | Leu        | Val        | Glu        | Glu        | Gly<br>135 | Ala         | Lys             | Thr.        | Ala        | Pro<br>140 | Gly        | Lys        | Lys        | Arg        |
|    | Pro<br>145 | Val         | Glu        | Pro        | Ser        | Pro<br>150 | Gln        | <b>A</b> rg | Ser             | Pro         | Asp<br>155 | Ser        | Ser        | Thr        | Gly        | Ile<br>160 |
| 35 | Gly        | Lys         | Lys        | Gly        | Gln<br>165 | Gln        | Pro        | Ala         | Lys             | Lys<br>170  | Arg        | Leu        | Asn        | Phe        | Gly<br>175 | Gln        |
| 40 | Thr        | Gly         | qeA        | Ser<br>180 | Glu        | Ser        | Val        | Pro         | Asp<br>185      | Pro         | Gln        | Pro        | Ile        | Gly<br>190 | Glu        | Pro        |
|    | Pro        | Ala         | Gly<br>195 | Pro :      | Ser        | Gly        | Leu        | Gly<br>200  | Ser             | Gly         | Thr        |            | Ala<br>205 | Ala        | Gly        | Gly        |
| 45 |            |             |            |            |            |            |            |             |                 |             |            |            |            |            |            |            |

| _  |   | Gl         | 210<br>210 |            | Met        | : Ala      | A Asp      | 215        |            | Glu        | ı Gly      | / Ala      | 220        |            | / Val      | r G17      | y Ser      |  |
|----|---|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|--|
| 5  |   | Ser<br>225 |            | : Gly      | Asn        | Trp        | His<br>230 |            | Asp        | Ser        | Thr        | Trp<br>235 |            | Gly        | , Ysk      | Arg        | Val<br>240 |  |
| 10 | • | Ile        | Thr        | Thr        | Ser        | Thr<br>245 |            | Thr        | Trp        | Ala        | Leu<br>250 |            | Thr        | туг        | : Asn      | Asn<br>255 | His        |  |
|    |   | Lev        | ı Tyr      | : Lys      | Gln<br>260 |            | Ser        | Asn        | Gly        | Thr<br>265 |            | Gly        | ely        | Ser        | Thr<br>270 |            | Asp        |  |
| 15 |   | Asn        | Thr        | Tyr<br>275 |            | Gly        | Tyr        | Ser        | Thr<br>280 |            | Trp        | Gly        | Tyr        | Phe<br>285 |            | Phe        | Asn        |  |
| 20 |   | Arg        | Phe<br>290 | His        | Cys        | His        | Phe        | Ser<br>295 |            | Arg        | Ąsp        | Trp        | Gln<br>300 |            | Leu        | Ile        | Asn        |  |
|    |   | Asn<br>305 | Asn        | Trp        | Gly        | Phe        | Arg<br>310 | Pro        | Lys        | Arg        | Leu        | Asn<br>315 | Phe        | Lys        | Leu        | Phe        | Asn<br>320 |  |
|    |   | Ile        | Gln        | Val        | Lys        | Glu<br>325 | Val        | Thr        | Gln        | Asn        | Glu<br>330 | Gly        | Thr        | Lys        | Thr        | Ile<br>335 | Ala        |  |
| 30 |   | Asn        | Asn        | Leu        | Thr<br>340 | Ser        | Thr        | Ile        | Gln        | Val<br>345 | Phe        | Thr        | Asp        | Ser        | Glu<br>350 | Tyr        | Gln        |  |
|    |   | Leu        | Pro        | Tyr<br>355 | Val        | Leu        | ely        | Ser        | Ala<br>360 | His        | Gln        | Gly        | Cys        | Leu<br>365 | Pro        | Pro        | Phe        |  |
| 35 |   | Pro        | Ala<br>370 | Asp        | Val        | Phe        | Met        | Ile<br>375 | Pro        | Gln        | Tyr        | Gly        | Tyr<br>380 | Leu        | Thr        | Leu        | Asn        |  |
| 40 |   | Asn<br>385 | Gly        | Ser        | Gln        | Ala        | Val<br>390 | еĵу        | Arg        | Ser        | Ser        | Phe<br>395 | Tyr        | Cys        | Leu        | Glu        | Tyr<br>400 |  |
|    |   | Phe        | Pro        | Ser        | Gln        | Met<br>405 | Leu        | Arg        | Thr        | Gly        | Asn<br>410 | neA        | Phe        | Glu        | Phe        | Ser<br>415 | Tyr        |  |
| 45 |   | Gln        | Phe        | Glu        | Asp<br>420 | Val        | Pro        | Phe        | His        | Ser<br>425 | Ser        | Tyr        | Ala        | His        | Ser<br>430 | Gln        | Ser        |  |
| 50 |   | Leu        | qeA        | Arg<br>435 | Leu        | Met        | Asn        | Pro        | Leu<br>440 | Ile        | ĄsĄ        | Gln        | Tyr        | Leu<br>445 | Tyr        | Tyr        | Leu        |  |
|    |   | Ser        | Arg<br>450 | Thr        | Gln        | Ser        | Thr        | Gly<br>455 | Glу        | Thr        | Ala        |            | Thr<br>460 | Gln        | Gln        | Leu        | Leu        |  |
| 55 |   |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |  |

| 5  | Phe<br>465 |            | Gln        | Ala        | Gly        | Pro<br>470 |            | Asn        | Met        | Ser        | Ala<br>475 |            | Ala        | Lys        | neA        | Trp<br>480 |
|----|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| ,  | Leu        | Pro        | Gly        | Pro        | Cys<br>485 |            | Arg        | Gln        | Gln        | Arg<br>490 |            | Ser        | Thr        | Thr        | Leu<br>495 | Ser        |
| 10 | Gln        | aeA        | Asn        | Asn<br>500 |            | Asn        | Phe        | Ala        | Trp<br>505 | Thr        | Gly        | Ala        | Thr        | Lys<br>510 | Tyr        | Ris        |
| 15 | Leu        | Asn        | Gly<br>515 |            | Asp        | Ser        | Leu        | Val<br>520 |            | Pro        | Gly        | Val        | Ala<br>525 |            | Ala        | Thr        |
|    | His        | Lys<br>530 | _          | Asp        | Glu        | Glu        | Arg<br>535 | Phe        | Phe        | Pro        | Ser        | Ser<br>540 | Gly        | Val        | Leu        | Met        |
| 20 | Phe<br>545 | _          | Lys        | Gln        | Gly        | Ala<br>550 | Gly        | Lys        | qeA        | neA        | Val<br>555 | Asp        | Tyr        | Ser        | Ser        | Val<br>560 |
| 25 | Met        | Leu        | Thr        | Ser        | Glu<br>565 | Glu        | Glu        | Ile        | Lys        | Thr<br>570 | Thr        | Asn        | Pro        | Val        | Ala<br>575 | Thr        |
|    | Glu        | Gln        | Tyr        | Gly<br>580 | Val        | Val        | Ala        | qeA        | Asn<br>585 | Leu        | Gln        | Gln        | Gln        | Asn<br>590 | Ala        | Ala        |
| 30 | Pro        | Ile        | Val<br>595 | Gly        | Ala        | Val        | Asn        | ser<br>600 | Gln        | Gly        | Ala        | Leu        | Pro<br>605 | Gly        | Met        | Val        |
| 35 | Trp        | Gln<br>610 | neA        | Arg,       | Asp        | Val        | Tyr<br>615 | Leu        | Gln        | Gly        | Pro        | Ile<br>620 | Trp        | Ala        | Lys        | Ile        |
|    | Pro<br>625 | His        | Thr        | Asp        | Gly        | Asn<br>630 | Phe        | His        | Pro        | Ser        | Pro<br>635 | Leu        | Met        | Gly        | Gly        | Phe<br>640 |
| 40 | Gly        | Leu        | Lys        | His        | Pro<br>645 | Pro        | Pro        | Gln        | Ile        | Leu<br>650 | Ile        | Lys        | Asn        | Thr        | Pro<br>655 | Val        |
| 45 | Pro        | Ala        | Asp        | Pro<br>660 | Pro        | Thr        | Thr        | Phe        | Ser<br>665 | Gln        | Ala        | Lys        | Leu        | Ala<br>670 | Ser        | Phe        |
|    | Ile        | Thr        | Gln<br>675 | Tyr        | Ser        | Thr        | Gly        | Gln<br>680 | Val        | Ser        | Val        | Glu        | Ile<br>685 | Glu        | Trp        | Glu        |
| 50 | Leu        | Gln<br>690 | Lys        | Glu        | Asn        | Ser        | Lys<br>695 | Arg        | Trp        | Asn        | Pro        | Glu<br>700 | Ile        | Gln        | Tyr        | Thr        |
| 55 | Ser<br>705 | Asn        | Tyr        | Tyr        | Lys        | Ser<br>710 | Thr        | πεA        | Val        | Asp        | Phe<br>715 | Ala        | Val        | Asn        | Thr        | Asp<br>720 |

| 5  | Gly                                                  | Thr     | Tyr S  | er Glu<br>725 | Pro Ar   | g Pro | Ile | Gly<br>730 | Thr | Arg | Tyr | Leu | Thr<br>735 | Arg |   |
|----|------------------------------------------------------|---------|--------|---------------|----------|-------|-----|------------|-----|-----|-----|-----|------------|-----|---|
|    | neA                                                  | Leu     |        |               |          |       |     |            |     |     |     |     |            |     |   |
|    | <b>.</b>                                             |         |        |               |          |       |     |            |     |     |     |     |            |     |   |
| 10 | <210> 82<br><211> 738<br><212> PRT<br><213> capsid p | protein | of AAV | serotype,     | clone 29 | .3VP1 |     |            |     |     |     |     |            |     |   |
| 15 | <400> 82                                             |         |        |               |          |       |     |            |     | ٠   |     |     |            |     |   |
| 20 |                                                      |         |        |               |          |       |     |            |     |     |     |     |            |     | , |
|    |                                                      |         |        | ÷             |          |       |     |            |     |     |     |     |            |     |   |
| 25 |                                                      |         |        |               |          |       |     |            |     |     |     |     |            |     |   |
| 30 |                                                      |         |        |               |          | -     |     | ·          |     |     |     |     |            |     |   |
| 35 |                                                      |         |        |               |          |       |     |            |     |     |     |     |            |     |   |
| -  |                                                      |         |        |               |          |       |     |            |     |     |     | •   |            |     |   |
| 40 |                                                      |         |        |               |          |       |     |            |     |     |     |     |            |     |   |
| 45 |                                                      |         |        |               |          |       |     |            |     |     |     |     |            |     | : |
|    |                                                      |         |        |               |          |       |     |            |     | ,   |     |     |            |     |   |
| 50 |                                                      |         |        |               |          |       |     |            |     |     |     |     |            |     |   |

|           | Met<br>1   | : Ala      | Ala        | qeA              | Gly<br>5   | Tyr        | Leu        | Pro        | Asp               | Trp<br>10  | Leu        | Glu        | Asp        | Asn        | Leu<br>15  | Sez        |
|-----------|------------|------------|------------|------------------|------------|------------|------------|------------|-------------------|------------|------------|------------|------------|------------|------------|------------|
| 5         | Glu        | Gly        | Ile        | Arg<br>20        | eJn        | Trp        | Trp        | Ala        | Leu<br>25         | Lys        | Pro        | Gly        | Ala        | Pro<br>30  | Lys        | Pro        |
| 10        | Lys        | Ala        | Asn<br>35  | Gln              | Gln        | Lys        | Gln        | Asp<br>40  | qe.K              | Gly        | Arg        | Gly        | Leu<br>4,5 | Val        | Leu        | Pro        |
|           | Gly        | Tyr<br>50  | Lys        | Tyr              | Leu        | Gly        | Pro<br>55  | Phe        | Asn               | Gly        | Leu        | Asp<br>60  | Lys        | Gly        | Glu        | Pro        |
| <i>15</i> | Val<br>65  | Asn        | Ala        | Ala <sup>.</sup> | Asp        | Ala<br>70  | Aļa        | Ala        | Leu               | Glu        | His<br>75  | Asp        | Lys        | Ala        | Tyr        | qeA<br>08  |
| 20        | Gln        | Gln        | Leu        | Lys              | Ala<br>85  | Gly        | Asp        | Asn        | Pro               | Tyr<br>90  | Leu        | Arg        | Tyr        | Asn        | His<br>95  | Ala        |
| 20        | Asp        | Ala        | Glu        | Phe<br>100       | Gln        | Glu        | Arg        | Leu        | Gln<br>105        | Glu        | Asp        | Thr        | Ser        | Phe<br>110 | Gly        | Gly        |
| 25        | Asn        | Leu        | Gly<br>115 | Arg              | Ala        | Val        | Phe        | Gln<br>120 | Ala               | Lys        | Lys        | Arg        | Val<br>125 | Leu        | Glu        | Pro        |
|           | Leu        | Gly<br>130 | Leu        | Val              | Glu        | Glu        | Gly<br>135 | Ala        | Lys               | Thr        | Ala        | Pro<br>140 | Gly        | Lys        | Lys        | Arg        |
| 30        | Pro<br>145 | Val        | Glu<br>    | Pro              | Ser        | Pro<br>150 | Gln        | Arg        | Ser               | Pro        | Asp<br>155 | Ser        | Thr        | Thr        | вĵу        | Ile<br>160 |
| 35.       | Gly        | Lys        | Lys        |                  | Gln<br>165 | Gln        | Pro        | Ala        | Lys               | Lys<br>170 | Arg        | Leu        | Asn        | Phe        | Gly<br>175 | Gln        |
| <u>.</u>  | Thr        | Gly        | Asp        | Ser<br>180       | Glu        | Ser        | Val        | Pro        | <b>Asp</b><br>185 | Pro        | Gln        | Pro        | Ile        | Gly<br>190 | Glu        | Pro        |
| 40        | Pro        | Ala        | Gly<br>195 | Pro              | Ser        | Gly        |            | Gly<br>200 | Ser               | Gly        | Thr        | Met        | Ala<br>205 | Ala        | ely        | Glу        |
|           |            |            |            | •                |            |            |            |            |                   |            |            |            |            |            |            |            |

| 5    | G17        | / Ala<br>210 |                   | Met        | Ala        | Asp        | 215        |            | Glu        | ı Gly      | Ala        | Asp<br>220 | _          | Val        | . Gly      | / Ser        |
|------|------------|--------------|-------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|--------------|
|      | Ser<br>225 | Ser          |                   | Asn        |            | His<br>230 |            | qeA        | 9er        | Thr        | Trp<br>235 |            | Gly        | Asp        | Arg        | 7 Val<br>240 |
|      | Ile        | Thr          | Thr               | Ser        | Thr<br>245 |            | Thr        | Trp        | Ala        | Leu<br>250 |            | Thr        | Tyr        | neA        | Asn<br>255 | His          |
| 15   | Leu        | Tyr          | Lys               | Gln<br>260 | Ile        | Ser        | Asn        | Gly        | Thr<br>265 |            | Gly        | Gly        | Ser        | Thr<br>270 |            | Asp          |
|      | Asn        | Thr          | <b>Tyr</b><br>275 | Phe        | Gly        | Tyr        | Ser        | Thr<br>280 |            | Trp        | Gly        | Tyr        | Phe<br>285 |            | Phe        | Asn          |
| 20   | Arg        | Phe<br>290   | His               | Cys        | His        | Phe        | Ser<br>295 | Pro        | Arg        | Asp        | Trp        | Gln<br>300 | Arg        | Leu        | Ile        | Asn          |
| 25   | Asn<br>305 |              | Trp               | eīà        | Phe        | Arg<br>310 | Pro        | Lуз        | Arg        | Leu        | Asn<br>315 | Phe        | Lys        | Leu        | Phe        | Asn<br>320   |
|      | Ile        | Gln          | Val               | Lys        | Glu<br>325 | Val        | Thr        | Gln        | Asn        | Glu<br>330 | Gly        | Thr        | Lys        | Thr        | Ile<br>335 |              |
| 30 . | neA        | Asn          | Leu               | Thr<br>340 | Ser        | Thr        | Ile        | Gln        | Val<br>345 | Phe        | Thr        | qeA        | Ser        | Glu<br>350 | Tyr        | Gln          |
| 35   | Leu        | Pro          | Tyr<br>355        | Val        | Leu        | Gly        | Ser        | Ala<br>360 | Arg        | Gln        | GŢĀ        | Cys        | Leu<br>365 | Pro        | Pro        | Phe          |
| ,    | Pro        | Ala<br>370   | Asp               | Val        | Phe        | Met        | Ile<br>375 | Pro        | Gln        | Tyr        | GЈУ        | Tyr<br>380 | Гел        | Thr        | Leu        | Asn          |
| 40   | Asn<br>385 | Gly          | Ser               | Gln        | Ala        | Val<br>390 | Gly        | Arg        | Ser        | Ser        | Phe<br>395 | Tyr        | Cys        | Leu        | Glu        | Tyr<br>400   |
| 45   | Phe        | Pro          | Ser               | Gln        | Met<br>405 | Leu        | Arg        | Thr        | Gly        | Asn<br>410 | aeA        | Phe        | Glu        | Phe        | Ser<br>415 | Tyr          |
|      | Gln        | Phe          | Glu               | Asp<br>420 | Val        | Pro        | Phe        | His        | Ser<br>425 | Ser        | Tyr        | Ala        | His        | Ser<br>430 | Gln        | Ser          |
| 50   | Leu        | Asp          | Arg<br>435        | Leu        | Met        | neA        | Pro        | Leu<br>440 | Ile        | Asp        | Gln        |            | Leu<br>445 | Tyr        | Tyr        | Leu          |
| 55   | Ser        | Arg<br>450   | Thr               | Gln        | Ser        |            | Gly<br>455 | Gly        | Thr        | Ala        |            | Thr<br>460 | Gln        | Gln        | Leu        | Leu          |

| 5  | Ph:        | e Se:      | r Gli      | n Ala        | a Gl       | 470        |            | n Ası      | n Met             | : Sei      | 47                |            | a Ala      | a Lys      | a Ası      | 1 Trp<br>480      |
|----|------------|------------|------------|--------------|------------|------------|------------|------------|-------------------|------------|-------------------|------------|------------|------------|------------|-------------------|
|    | Le:        | l Pro      | o G13      | y Pro        | 483        |            | : Arç      | ; Glr      | Glr               | Arg<br>490 |                   | Ser        | Thi        | Thr        | Let<br>495 | ser               |
| 10 | Glr        | Asr        | a Asr      | 1 Asn<br>500 |            | : Ast      | Phe        | àla        | 505               |            | G1)               | Ala        | Thr        | 510        |            | His               |
| 15 | Leu        | a Asr      | 515        |              | Asp        | ) Ser      | Leu        | Val<br>520 |                   | Pro        | Gly               | Val        | Ala<br>525 |            | Ala        | Thr               |
|    | <br>His    | Lys<br>530 | qeA        | qeA          | Glu        | Glu        | Arg<br>535 |            | Phe               | Pro        | Ser               | Ser<br>540 |            | Val        | Leu        | Met               |
| 20 | Phe<br>545 | Gly        | Lys        | Gln          | Gly        | Ala<br>550 |            | Lys        | Gly               | Asn        | <b>Val</b><br>555 |            | туг        | Ser        | Ser        | <b>Val</b><br>560 |
| 25 | Met        | Leu        | Thr        | Ser          | Glu<br>565 | Glu        | Glu        | Ile        | Lys               | Thr<br>570 | Thr               | Asn        | Pro        | Val        | Ala<br>575 | Thr               |
|    | <br>Glu    | Gln        | Tyr        | Gly<br>580   | Val        | Val        | Ala        | Asp        | <b>Asn</b><br>585 | Leu        | Gln               | Gln        | Gln        | Asn<br>590 | Ala        | Ala               |
| 30 | Pro        | Ile        | Val<br>595 | Gly          | Ala        | Val        | neA        | Ser<br>600 | Gln               | ely        | Ala               | Leu        | Pro<br>605 | Gly        | Met        | Val               |
| 35 | Trp        | Gln<br>610 | Asn        | Arg          | qeA        | Val        | Tyr<br>615 | Leu        | Gln               | Gly        | Pro               | Ile<br>620 | Trp        | Ala        | Lys        | Ile               |
|    | Pro<br>625 | His        | Thr        | qeA          | e7À        | Asn<br>630 | Phe        | His        | Pro               | Ser        | Pro<br>635        | Leu        | Met        | Gly        | Gly        | Phe<br>640        |
| 40 | <br>Gly    | Leu        | Lys        | His          | Pro<br>645 | Pro        | Pro        | Gln        | Ile               | Leu<br>650 | Ile               | Lys        | neA        | Thr        | Pro<br>655 | Val               |
| 45 | Pro        | Ala        | qeA        | Pro<br>660   | Pro        | Thr        | Thr        | Phe        | Ser<br>665        | Gln        | Ala               | Lys        | Leu        | Ala<br>670 | Ser        | Phe               |
|    | Ile        | Thr        | Gln<br>675 | Tyr          | Ser        | Thr        | Gly        | Gln<br>680 | Val               | Ser        | Val               | Glu        | Ile<br>685 | Glu        | Trp        | Glu               |
| 50 | Leu        | Gln<br>690 | Lys        | Glu          | Asn        | Ser        | Lys<br>695 | Arg        | Trp               | Asn        |                   | Glu<br>700 | Ile        | Gln        | Tyr        | Thr               |
| 55 | Ser<br>705 | Asn        | Tyr        | Tyr          | Lys        | Ser<br>710 | Thr .      | Asn        | Val :             |            | Phe<br>715        | Ala        | Val        | neA        | Thr .      | Asp<br>720        |

Gly Thr Tyr Ser Glu Pro Arg Pro Ile Gly Thr Arg Tyr Leu Thr Arg 725 730 735

| 5          |                  |            |            |          |            |            |            |            |      |            |            |            |           |       |            |            |                     |
|------------|------------------|------------|------------|----------|------------|------------|------------|------------|------|------------|------------|------------|-----------|-------|------------|------------|---------------------|
|            |                  | Ası        | ı Let      | ı        |            |            |            |            |      |            |            |            |           |       |            |            |                     |
|            |                  |            |            |          |            |            |            |            |      |            |            |            |           |       |            |            |                     |
|            |                  |            |            |          |            | •          |            |            |      |            |            |            |           |       |            |            |                     |
| 10         | <210>            |            |            |          |            |            |            |            |      |            |            |            |           |       |            |            |                     |
|            | <211> `<br><212> |            |            |          |            |            |            |            |      |            |            |            |           |       |            |            |                     |
|            | <213>            |            | prote      | in of A  | ₩V se      | erotyp     | e, clo     | ne 29.     | 5VP1 |            |            |            |           |       |            |            |                     |
| 15         | <400> 8          | 83         |            |          |            |            |            |            |      |            |            |            |           |       |            |            |                     |
|            |                  | Met        | : Ala      | Ala      | Asp        | Gly        | Ty         | Leu        | Pro  | Ast        | Tr         | Lev        | ı Glı     | ı Ası | Asr        | ı Lev      | Ser                 |
| 20         |                  | 1          |            |          |            | 5          | _          |            |      | -          | 10         |            |           |       |            | 15         |                     |
|            |                  | Glu        | Gly        | lle      | Arg<br>20  | Glu        | Trp        | Trp        | Ala  | Leu<br>25  | Lys        | Pro        | Gly       | / Ale | Pro<br>30  | Lys        | Pro                 |
| 25         |                  | Lys        | Ala        | Asn      | Gln        | Gln        | Lys        | Gln        | Asp  | Asp        | Gly        | ' Arg      | Gly       | / Leu | . Val      | . Leu      | Pro                 |
|            |                  |            |            | 35       |            |            |            |            | 40   |            |            |            |           | 45    |            |            |                     |
|            |                  | Gly        | Tyr<br>50  | Lys      | Tyr        | Leu        | Gly        | Pro<br>55  | Phe  | Asn        | Gly        | Leu        | Asp<br>60 | Lys   | ely        | Glu        | Pro                 |
| 30         |                  |            |            |          |            |            |            |            |      |            |            |            | 50        |       |            | -          |                     |
|            |                  | Val<br>65  | Asn        | Ala      | Ala        | Asp        | Ala<br>70  | Ala        | Ala  | Leu        | Glu        | His<br>75  | qeA       | Lys   | Ala        | Tyr        | Asp<br>80           |
| <i>35</i>  |                  | Gln        | Gln        | Leu      | Lys        | Ala<br>85  | Gly        | Asp        | Asn  | Pro        | Tyr<br>90  | Leu        | Arg       | Tyr   | Asn        | His<br>95  | Ala                 |
|            |                  |            |            |          | •          |            |            |            |      |            |            |            |           |       |            |            |                     |
|            |                  | Asp        | Ala        | Glu<br>, | Phe<br>100 | Gln        | Glu        | Arg        | Leu  | Gln<br>105 | Glu        | Asp        | Thr       | Ser   | Phe<br>110 | ељ         | <b>G</b> ly         |
| 40         |                  | Asn        | Leu        | Gly      | Arg        | Ala        | Val        | Phe        | Gln  | Ala        | Lys        | Lys        | Arg       | Val   | Leu        | Glu        | Pro                 |
|            |                  |            |            | 115      |            |            |            |            | 120  |            |            |            |           | 125   |            |            |                     |
| 45         |                  | Leu        | Gly<br>130 | Leu      | Val        | Glu        | Glu        | Gly<br>135 | Ala  | Lys        | Thr        | Ala        |           | Gly   | Lys        | Lys        | Arg                 |
|            |                  |            |            |          |            |            |            | 133        |      |            |            |            | 140       |       |            |            |                     |
|            |                  | Pro<br>145 | Val        | Glu      | Pro        | Ser        | Pro<br>150 | Gln        | Arg  | Ser        | Pro        | Asp<br>155 | Ser       | Ser   | Thr        | Gly        | Ile<br>1 <b>6</b> 0 |
| 50         |                  |            |            |          |            |            |            |            |      |            |            |            |           |       |            |            |                     |
|            | 5                | Gly        | Lys        | Lys      | Gly        | Gln<br>165 | Gln        | Pro        | Ala  | Lys        | Lys<br>170 | Arg        | Leu       | Asn   | Phe        | Gly<br>175 | Gln                 |
| 5 <b>5</b> |                  | Thr        | Gly        | Asp      | Ser        | Glu        | Ser        | Val        | Pro  | Asp        | Pro        | Gln        | Pro       | Ile   | Gly        | Glu        | Pro                 |
| JJ         |                  |            |            |          | 180        |            |            |            |      | 185        |            |            |           |       | 190        |            |                     |

| 5 Gly Ala Pro Met Ala Asp Asn Asn Glu Gly Ala Asp Gly Val Gly Ser 210                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |    | P          | ro A         | la G        | ly P<br>95 | ro s       | er G         | ly L        | 20<br>20     | .y Se<br>0  | er Gl        | ly Th      | ar M        | et. A<br>2  | la A<br>05 | la G      | ly Gly        |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|------------|--------------|-------------|------------|------------|--------------|-------------|--------------|-------------|--------------|------------|-------------|-------------|------------|-----------|---------------|
| Ile Thr Thr Ser Thr Arg Thr Trp Ale Leu Pro Thr Tyr Asn Asn His 245  Leu Tyr Lys Gln Ile Ser Asn Gly Thr Ser Gly Gly Ser Thr Asn Asp Asp 260  Asn Thr Tyr Phe Gly Tyr Ser Thr Pro Trp Gly Tyr Phe Asp Phe Asn 275  Arg Phe His Cys His Phe Ser Pro Arg Asp Trp Gln Arg Leu Ile Asn 300  Asn Asn Trp Gly Phe Arg Pro Lys Ser Leu Asn Phe Lys Leu Phe Asn 305  Asn Asn Trp Gly Phe Arg Pro Lys Ser Leu Asn Phe Lys Leu Phe Asn 325  Asn Asn Trp Gly Glu Val Thr Gln Asn Glu Gly Thr Lys Thr Ile Ala 335  Asn Asn Leu Thr Ser Thr Ile Gln Val Phe Thr Asp Ser Glu Tyr Gln 340  Leu Pro Tyr Val Leu Gly Ser Ala His Gln Gly Cys Leu Pro Pro Phe 355  Leu Pro Ala Asp Val Phe Met Ile Pro Gln Tyr Gly Tyr Leu Thr Leu Asn 370  Asn Gly Ser Gln Ala Val Gly Arg Ser Ser Phe Tyr Cys Leu Glu Tyr 400  Phe Pro Ser Gln Met Leu Arg Thr Gly Asn Asn Phe Glu Phe Ser Tyr 405  Gln Phe Glu Asp Val Pro Phe His Ser Ser Tyr Ala His Ser Gln Ser 420  Leu Asp Arg Leu Met Asn Pro Leu Ile Asp Gln Tyr Leu Tyr Tyr Leu 435  Leu Asp Arg Leu Met Asn Pro Leu Ile Asp Gln Tyr Leu Tyr Tyr Leu 435 | 5  | G)         | Ly A.<br>2:  | la Pi<br>10 | ro M       | et A       | la As        | 3p As<br>2] | sn As<br>LS  | n G)        | lu Gl        | y Al       | .a A:<br>22 | sp G:<br>20 | ly V       | al G      | ly Ser        |
| Leu Tyr Lys Gln Ile Ser Asn Gly Thr Ser Gly Gly Ser Thr Asn Asp 260  Asn Thr Tyr Phe Gly Tyr Ser Thr Pro Trp Gly Tyr Phe Asp Phe Asn 270  Asn Thr Tyr Phe Gly Tyr Ser Thr Pro Trp Gly Tyr Phe Asp Phe Asn 285  Arg Phe His Cys His Phe Ser Pro Arg Asp Trp Gln Arg Leu Ile Asn 290  25  Asn Asn Trp Gly Phe Arg Pro Lys Ser Leu Asn Phe Lys Leu Phe Asn 305  Ile Gln Val Lys Glu Val Thr Gln Asn Glu Gly Thr Lys Thr Ile Ala 325  Asn Asn Leu Thr Ser Thr Ile Gln Val Phe Thr Asp Ser Glu Tyr Gln 345  Leu Pro Tyr Val Leu Gly Ser Ala His Gln Gly Cys Leu Pro Pro Phe 355  Leu Fro Tyr Val Leu Gly Ser Ala His Gln Gly Cys Leu Pro Pro Phe 367  370  Asn Gly Ser Gln Ala Val Gly Arg Ser Ser Phe Tyr Cys Leu Glu Tyr 385  Phe Pro Ser Gln Met Leu Arg Thr Gly Asn Asn Phe Glu Phe Ser Tyr 405  Gln Phe Glu Asp Val Pro Phe His Ser Ser Tyr Ala His Ser Gln Ser 425  Leu Asp Arg Leu Met Asn Pro Leu Ile Asp Gln Tyr Leu Tyr Tyr Leu 435                                                                                                                                          | 10 | S e<br>2 2 | r Se         | er Gl       | y A:       | sn T       | rp Hi<br>23  | .s Cy<br>10 | rs As        | p Se        | r Th         | r Tr<br>23 | p Le<br>5   | eu Gl       | ly As      | sp Gl     | ly Val<br>240 |
| Leu Tyr Lys Gln Ile Ser Asn Gly Thr Ser Gly Gly Ser Thr Asn Asp 260  Asn Thr Tyr Phe Gly Tyr Ser Thr Pro Trp Gly Tyr Phe Asp Phe Asn 285  Arg Phe His Cys His Phe Ser Pro Arg Asp Trp Gln Arg Leu Ile Asn 285  Asn Asn Trp Gly Phe Arg Pro Lys Ser Leu Asn Phe Lys Leu Phe Asn 305  Ile Gln Val Lys Glu Val Thr Gln Asn Glu Gly Thr Lys Thr Ile Ala 325  Asn Asn Leu Thr Ser Thr Ile Gln Val Phe Thr Asp Ser Glu Tyr Gln 335  Leu Pro Tyr Val Leu Gly Ser Ala His Gln Gly Cys Leu Pro Pro Phe 355  Leu Pro Ala Asp Val Phe Met Ile Pro Gln Tyr Gly Tyr Leu Thr Leu Asn 370  Asn Gly Ser Gln Ala Val Gly Arg Ser Ser Phe Tyr Cys Leu Glu Tyr 405  Phe Pro Ser Gln Met Leu Arg Thr Gly Asn Asn Phe Glu Phe Ser Tyr 405  Gln Phe Glu Asp Val Pro Phe His Ser Ser Tyr Ala His Ser Gln Ser 425  Leu Asp Arg Leu Met Asn Pro Leu Ile Asp Gln Tyr Leu Tyr Tyr Leu                                                                                                                                                                                                                        | 45 | Il         | e Th         | r Th        | r Se       | er Th      | r Ar<br>15   | g Th        | r Trį        | P Al        | a Le         | u Pr       | o Th        | r Ty        | r As       |           |               |
| 250  Arg Phe His Cys His Phe Ser Pro Arg Asp Trp Gln Arg Leu Ile Asn 295  Asn Asn Trp Gly Phe Arg Pro Lys Ser Leu Asn Phe Lys Leu Phe Asn 320  Ile Gln Val Lys Glu Val Thr Gln Asn Glu Gly Thr Lys Thr Ile Ala 335  Asn Asn Leu Thr Ser Thr Ile Gln Val Phe Thr Asp Ser Glu Tyr Gln 345  Leu Pro Tyr Val Leu Gly Ser Ala His Gln Gly Cys Leu Pro Pro Phe 355  Leu Pro Ala Asp Val Phe Met Ile Pro Gln Tyr Gly Tyr Leu Thr Leu Asn 365  Asn Gly Ser Gln Ala Val Gly Arg Ser Ser Phe Tyr Cys Leu Glu Tyr 405  Phe Pro Ser Gln Met Leu Arg Thr Gly Asn Asn Phe Glu Phe Ser Tyr 415  Gln Phe Glu Asp Val Pro Phe His Ser Ser Tyr Ala His Ser Gln Ser 425  Leu Asp Arg Leu Met Asn Pro Leu Ile Asp Gln Tyr Leu Tyr Tyr Leu Asn 445                                                                                                                                                                                                                                                                                                                                                     | 15 | Le         | и <b>Т</b> у | r Ly        | s G1<br>26 | n Il       | e Se         | r As:       | n Gly        | 7 Th:<br>26 | r Sei<br>5   | c Gl       | y Gl        | y Se        | r Th<br>27 | r As<br>O | n Asp         |
| 25                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 20 |            | n Th         | ту:<br>27   | r Ph<br>5  | e Gl       | у Ту:        | r Se        | r Thr<br>280 | Pro         | o Trp        | Gly        | Y Ty:       |             |            | p Ph      | e Asn         |
| Ash   Ash   Ash   Trp   Gly   Phe   Arg   Pro   Lys   Ser   Leu   Ash   Phe   Lys   Leu   Phe   Ash   320     30                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 25 | Arg        | 9 Pho<br>290 | e Hi:       | з∙Су       | s Hi       | s Phe        | 295         | Pro          | Arg         | J Asp        | Trp        | Gl:<br>300  | a Ari       | g Le       | ı Ile     | e Asn         |
| 35 Asn Asn Leu Thr Ser Thr Ile Gln Val Phe Thr Asp Ser Glu Tyr Gln 340 Leu Pro Tyr Val Leu Gly Ser Ala His Gln Gly Cys Leu Pro Pro Phe 355 Val Phe Met Ile Pro Gln Tyr Gly Tyr Leu Thr Leu Asn 370 Asn Gly Ser Gln Ala Val Gly Arg Ser Ser Phe Tyr Cys Leu Glu Tyr 400 Phe Pro Ser Gln Met Leu Arg Thr Gly Asn Asn Phe Glu Phe Ser Tyr 415 Fhe Pro Gln Phe Glu Asp Val Pro Phe His Ser Ser Tyr Ala His Ser Gln Ser Leu Asp Arg Leu Met Asn Pro Leu Ile Asp Gln Tyr Leu Tyr Leu Ash Ash Arg Leu Met Asn Pro Leu Ile Asp Gln Tyr Leu Tyr Tyr Leu Ash Ash Arg Leu Met Asn Pro Leu Ile Asp Gln Tyr Leu Tyr Tyr Leu Ash Ash Arg Leu Met Ash Pro Leu Ile Asp Gln Tyr Leu Tyr Tyr Leu Ash                                                                                                                                                                                                                                                                                                                                                                                                | 25 | Asn<br>305 | Asr<br>;     | Tr          | Gl;        | y Phe      | e Arg<br>310 | Pro         | Lys          | Ser         | Leu          | Asn<br>315 | Phe         | Lys         | s Lei      | Phe       |               |
| Leu Pro Tyr Val Leu Gly Ser Ala His Gln Gly Cys Leu Pro Pro Phe 355 Val Leu Gly Ser Ala His Gln Gly Cys Leu Thr Leu Asn 370 Asn Gly Ser Gln Ala Val Gly Arg Ser Ser Phe Tyr Cys Leu Glu Tyr 400 Phe Pro Ser Gln Met Leu Arg Thr Gly Asn Asn Phe Glu Phe Ser Tyr 415  Gln Phe Glu Asp Val Pro Phe His Ser Ser Tyr Ala His Ser Gln Ser 425 Leu Asp Arg Leu Met Asn Pro Leu Ile Asp Gln Tyr Leu Tyr Leu 445                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 30 | Ile        | Gln          | Val         | Ly         | 325        | ı Val        | Thr         | Gln          | Asn         | Glu<br>330   | Gly        | Thr         | Lys         | Thr        |           |               |
| Leu Pro 355 Val Leu Gly Ser Ala His Gln Gly Cys Leu Pro Pro Phe 365 Pro Ala Asp Val Phe Met Ile Pro Gln Tyr Gly Tyr Leu Thr Leu Asn 380 Gly Ser Gln Ala Val Gly Arg Ser Ser Phe Tyr Cys Leu Glu Tyr 400 Phe Pro                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 35 | Asn        | Asn          | Leu         | Thr<br>340 | Ser        | Thr          | Ile         | Gln          | Val<br>345  | Phe          | Thr        | qeA         | Ser         | Glu<br>350 | Tyr       | Gln           |
| Asn Gly Ser Gln Ala Val Gly Arg Ser Ser Phe Tyr Cys Leu Glu Tyr 400  Phe Pro Ser Gln Met Leu Arg Thr Gly Asn Asn Phe Glu Phe Ser Tyr 415  Gln Phe Glu Asp Val Pro Phe His Ser Ser Tyr Ala His Ser Gln Ser 425  Leu Asp Arg Leu Met Asn Pro Leu Ile Asp Gln Tyr Leu Tyr Tyr Leu 445                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |    | Leu        | Pro          | Tyr<br>355  | Val        | . Leu      | Gly          | Ser         | Ala<br>360   | His         | Gln          | ely        | Cys         | Leu<br>365  | Pro        | Pro       | Phe           |
| Phe Pro Ser Gln Met Leu Arg Thr Gly Asn Asn Phe Glu Phe Ser Tyr 415  Gln Phe Glu Asp Val Pro Phe His Ser Ser Tyr Ala His Ser Gln Ser 425  Leu Asp Arg Leu Met Asn Pro Leu Ile Asp Gln Tyr Leu Tyr Tyr Leu 445                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 40 | Pro        | Ala<br>370   | Азр         | Val        | Phe        | Met          | Ile<br>375  | Pro          | Gln         | Tyr          | Gly        | Tyr<br>380  | Leu         | Thr        | Leu       | Asn           |
| Phe Pro Ser Gln Met Leu Arg Thr Gly Asn Asn Phe Glu Phe Ser Tyr 415  50 Gln Phe Glu Asp Val Pro Phe His Ser Ser Tyr Ala His Ser Gln Ser 425  Leu Asp Arg Leu Met Asn Pro Leu Ile Asp Gln Tyr Leu Tyr Tyr Leu 445                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 45 | Asn<br>385 | Gly          | Ser         | Gln        | Ala        | Val<br>390   | Gly         | Arg          | Ser         | Ser          | Phe<br>395 | Tyr         | Суз         | Leu        | Glu       |               |
| Leu Asp Arg Leu Met Asn Pro Leu Ile Asp Gln Tyr Leu Tyr Tyr Leu<br>435 440 445                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 45 | Phe        | Pro          | Ser         | Gln        | Met<br>405 | Leu          | Arg         | Thr          | Gly         | Asn .<br>410 | Asn        | Phe         | Glu         | Phe        |           | Tyr           |
| 440 445                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 50 | Gln        | Phe          | Glu         | Asp<br>420 | Val        | Pro          | Phe         | His :        | Ser<br>425  | Ser '        | Tyr .      | Ala         | His         |            | Gln       | Ser           |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 55 | Leu        | Asp          | Arg<br>435  | Leu        | Met        | Asn          | Pro         | Leu 1<br>440 | Tle :       | Asp (        | eln :      | Tyr         | Leu<br>445  | Tyr        | туг       | Leu           |

| -   |   |          | Ser        | 45         | g Th<br>O  | r G1            | n Se       | er Th        | r Gl<br>45 |              | y Tì       | r Al       | a Gl       | y Th<br>46 |              | n Gl       | n Le         | u Lei        |
|-----|---|----------|------------|------------|------------|-----------------|------------|--------------|------------|--------------|------------|------------|------------|------------|--------------|------------|--------------|--------------|
| 5   |   |          | Phe<br>465 | Se:        | r Gl       | n Al            | .a G1      | y Pr<br>47   | eA o:<br>0 | a As         | n Me       | t Se       | r Al<br>47 | a Gl<br>5  | n Al         | a Ly       | s As         | n Trp<br>480 |
| 10  |   |          | Leu        | Pro        | o Gl       | y Pr            | o Cy<br>48 | з Ту<br>5    | r' Ar      | g Gl         | n Gl       | n Ar<br>49 |            | l Se       | r Th.        | r Th       | r Lei<br>49  | u Ser<br>5   |
|     |   | (        | Sln        | Ası        | n Ası      | e A s<br>50     | n Se<br>O  | r As         | n Ph       | e Ala        | B Tr       | p Thi      | e Gly      | y Ala      | a Thi        | Ly:<br>510 |              | His          |
| 15  |   | 1        | Seu        | Asn        | 61;<br>51; | y Ar            | g As       | p Se         | r Le       | u Va:<br>520 | l As:      | n Pro      | Gl;        | / Val      | L Ala<br>525 |            | - Ala        | 1 Thr        |
| 20  |   | H        | lis        | Lys<br>530 | Asp        | As <sub>1</sub> | o Gl       | u Gl         | 4 Arg      | g Phe<br>5   | e Pho      | e Pro      | Ser        | 540        |              | / Val      | l Lev        | Met          |
| 0.5 |   | <b>9</b> | he<br>45   | Gly        | Lys        | Gli             | a Gly      | y Ala<br>550 | a Gly      | , Lys        | , Ası      | Asn        | Val<br>555 | Asp        | Tyr          | : Ser      | Ser          | Val<br>560   |
| 25  |   | М        | et         | Leu        | Thr        | Sei             | Gl:<br>565 | ı Glı        | ı Glu      | lle          | Lys        | Thr<br>570 | Thr        | Asn        | Pro          | Val        | . Ala<br>575 |              |
| 30  |   | G        | lu         | Gln        | Tyr        | G13<br>580      | Va]        | . Val        | . Ala      | qeA          | Asn<br>585 | Leu        | Gln        | Gln        | Gln          | neA<br>090 |              | Ala          |
|     |   | ₽.       | ro         | Ile        | Val<br>595 | Gly             | Ala        | Val          | Asn        | Ser<br>600   | Gln        | Gly        | Ala        | Leu        | Pro<br>605   | Gly        | Met          | Val          |
| 35  |   | T        | rp         | Gln<br>610 | Asn        | Arg             | Asp        | Val          | Tyr<br>615 | Leu          | Gln        | Gly        | Pro        | Ile<br>620 | Trp          | Ala        | Lys          | Ile          |
| 40  |   | P:       | 25         | His        | Thr        | Asp             | ely        | Asn<br>630   | Phe        | His          | Pro        | Ser        | Pro<br>635 | Leu        | Met          | Gly        | Gly          | Phe<br>640   |
|     |   | G        | Ly :       | Leu        | Lys        | His             | Pro<br>645 | Pro          | Pro        | Gln          | Ile        | Leu<br>650 | Ile        | Lys        | Asn          | Thr        | Pro<br>655   | Val          |
| 45  |   | Pr       | :o         | Ala        | Asp        | Pro<br>660      | Pro        | Thr          | Thr        | Phe          | Ser<br>665 | Gln        | Ala        | Lys        | Leu          | Ala<br>670 | Ser          | Phe          |
| 50  |   | 11       | .e :       | Thr        | Gln<br>675 | Tyr             | Ser        | Thr          | Gly        | Gln<br>680   | Val        | Ser        | Val        | Glu        | Ile<br>685   | Glu        | Trp          | Glu          |
|     | ÷ | Le       | u (        | 51n<br>590 | Lys        | Glu             | Asn        | Ser          | Lys<br>695 | Arg          | Trp        | Asn        |            | Glu<br>700 | Ile          | Gln        | Tyr          | Thr          |
| 55  |   |          |            |            |            |                 |            |              |            |              |            |            |            |            |              |            |              |              |

|     |                                                  | 3er<br>705 | Asn    | Tyr   | Tyr    | Lys        | Ser<br>710 | Thr  | neA | Val | Asp        | Phe<br>715 | Ala | Val | Asn | Thr        | Asp<br>720 |
|-----|--------------------------------------------------|------------|--------|-------|--------|------------|------------|------|-----|-----|------------|------------|-----|-----|-----|------------|------------|
| 5 · |                                                  | Gly        | Thr    | туг   | Ser    | Glu<br>725 | Pro        | Arg  | Pro | Ile | Gly<br>730 | Thr        | Arg | Tyr | Leu | Thr<br>735 | Arg        |
| 10  |                                                  | Asn        | Leu    |       |        |            |            |      |     |     |            |            | ,   |     | ,   |            |            |
| 15  | <210> 84<br><211> 738<br><212> PRT<br><213> caps |            | ein of | AAV : | seroty | pe, ci     | one 4:     | 2.15 |     |     |            |            |     |     |     |            |            |
|     | <400> 84                                         |            |        |       |        |            |            |      |     |     |            |            |     |     |     |            |            |
| 20  |                                                  |            |        |       |        |            |            |      | •   |     |            |            |     |     |     |            |            |
|     |                                                  |            |        |       |        |            |            |      |     |     |            |            |     |     |     |            |            |
| 25  |                                                  |            |        |       |        |            |            |      |     |     |            |            |     |     |     |            |            |
|     |                                                  |            |        |       |        |            |            |      |     |     |            |            |     |     |     |            |            |
| 30  |                                                  |            |        |       |        |            |            |      |     |     |            |            |     |     |     |            |            |
|     |                                                  |            |        |       |        |            |            |      |     |     |            |            |     |     |     |            |            |
| 35  |                                                  |            |        |       |        |            |            |      |     |     |            |            |     |     |     |            |            |
|     |                                                  |            |        |       | ,      |            |            |      |     |     |            |            |     |     |     |            |            |
| 40  | ,                                                |            |        |       |        |            |            |      |     |     |            |            |     |     |     | -          |            |
|     |                                                  |            |        |       |        |            |            |      |     |     |            | •          |     |     |     |            |            |
| 45  |                                                  |            |        |       |        |            |            |      |     |     |            |            |     |     |     |            |            |
|     |                                                  |            |        |       |        |            |            |      |     |     |            |            |     |     |     |            |            |
| 50  |                                                  |            |        |       |        |            |            |      |     |     |            |            |     |     |     |            |            |
|     | ٠                                                |            |        |       |        |            |            |      |     |     |            |            |     |     |     |            |            |
| 55  |                                                  |            | -      |       |        |            |            |      |     |     |            |            |     |     |     |            |            |

| 5    | Me<br>1    | t Al        | a Ala      | a Asp      | 5 Gl       | y Ty       | r Le       | u Pr       | O As       | P Tr               | p Le       | u Gli      | ı Ası      | eA q       | n Le<br>15 | u Ser       |
|------|------------|-------------|------------|------------|------------|------------|------------|------------|------------|--------------------|------------|------------|------------|------------|------------|-------------|
| 3    | G)         | u Gl        | y Ile      | Arg<br>20  | Glu        | Tr         | P Tr       | e As       | Lei<br>25  | u Ly:              | s Pro      | Gl)        | / Ala      | 30         | o Ly       | s Pro       |
| 10   | Lys        | Ala         | Asn<br>35  | Gln        | Gln        | Lys        | G G l r    | Asp<br>40  | a Ası      | ) `G1 <sub>3</sub> | / Arg      | Gly        | Leu<br>45  | va)        | Le         | u Pro       |
|      | Gly        | 7 Tyr<br>50 | ey1        | Tyr        | Leu        | Gly        | Pro<br>55  | Phe        | : Asn      | Gly                | ' Leu      | Asp<br>60  | Lys        | Gly        | ' Glı      | Pro         |
| 15   | Val<br>65  | aeA         | Ala        | Ala        | Asp        | Ala<br>70  | Ala        | Ala        | Leu        | Glu                | His<br>75  | Asp        | Lys        | Ala        | Туг        | 7 Asp<br>80 |
| . 20 | Gln        | Gln         | Leu        | Lys        | Ala<br>85  | Gly        | Asp        | Asn        | Pro        | Tyr<br>90          | Leu        | Arg        | Tyr        | Asn        | His<br>95  | Ala         |
|      | Asp        | Ala         | Glu        | Phe<br>100 | Gln        | Glu        | Arg        | Leu        | Gln<br>105 | Glu                | Asp        | Thr        | Ser        | Phe<br>110 | Gly        | Gly         |
| 25   | Asn        | Leu         | Gly<br>115 | Arg        | Ala        | Val        | Phe        | Gln<br>120 | Ala        | Lys                | Lys        | Arg        | Val<br>125 | Leu        | Glu        | Pro .       |
| 30   | Leu        | Gly<br>130  | Leu        | Val        | Glu        | Glu        | Gly<br>135 | Ala        | Lys        | Thr                | Ala        | Pro<br>140 | Gly        | Lys        | Lys        | Arg         |
| •    | Pro<br>145 | Val         | Glu        | Pro        | Ser        | Pro<br>150 | Gln        | Arg        | Ser        | Pro                | Asp<br>155 | Ser        | Ser        | Thr        | Gly        | Ile<br>160  |
| 35   | Gly        | Lys         | Thr        | Gly (      | 31n<br>165 | Gln        | Pro .      | Ala        | Lys        | Lys<br>170         | Arg        | Leu ,      | Asn        |            | Gly<br>175 | Gln         |
| 40   | Thr        | Gly .       | Asp :      | Ser (      | Slu :      | ser '      | Val :      | Pro .      | Asp        | Pro                | Gln :      | Pro :      |            | Gly (      | Glu        | Pro         |

|      | Pr                | o Al        | a Gl<br>19 | y Pro<br>5 | o Se       | z Gly      | / Leu      | 200               | y Se:      | c Gl       | y Thi      | r Mei            | 20         |            | a Gl       | y Gly        |
|------|-------------------|-------------|------------|------------|------------|------------|------------|-------------------|------------|------------|------------|------------------|------------|------------|------------|--------------|
|      | Gl                | y Al.<br>21 | a Pr       | o Mei      | E Ala      | a Asp      | 215        |                   | a Gli      | ı Gl       | y Ala      | 220              |            | y Val      | l Gl       | y Ser        |
| 10   | Se:               | r Sei       | r Gl       | у Азг      | Tr         | 230        |            | Asp               | Se:        | Thi        | 235        |                  | ı Gly      | y Ası      | Arq        | 7 Val<br>240 |
|      | Ile               | e Thi       | Thi        | Ser        | Th: 245    | Arg        | Thr        | Trp               | Ala        | Lev<br>250 |            | Thr              | туг        | : Asr      | 255        | His          |
| 15   | Lev               | туг         | Lys        | Gln<br>260 | Ile        | : Ser      | Asn        | Gly               | Thr<br>265 |            | Gly        | Gly              | Ser        | Thr<br>270 |            | qeA          |
| . 20 | Asr               | Thr         | Tyr<br>275 | Phe        | Gly        | Tyr        | Ser        | Thr<br>280        | Pro        | Trp        | Gly        | Tyr              | Phe<br>285 |            | Phe        | Asn          |
|      | Arg               | Phe<br>290  | His        | Cys        | His        | Phe        | Ser<br>295 | Pro               | Arg        | Asp        | Trp        | Gln<br>300       | Arg        | Leu        | Ile        | Asn          |
| 25   | <b>Asn</b><br>305 | Asn         | Trp        | Gly        | Phe        | Arg<br>310 | Pro        | Lys               | Arg        | Leu        | Asn<br>315 | Phe              | Lys        | Leu        | Phe        | Asn<br>320   |
| 30   | Ile               | Gln         | Val        | Lys        | Glu<br>325 | Val        | Thr        | Gln               | Asn        | Glu<br>330 | elà        | Thr              | Lys        | Thr        | Ile<br>335 | Ala          |
|      | neA               | Asn         | Leu        | Thr<br>340 | Ser        | Thr        | Ile        | Gln               | Val<br>345 | Phe        | Thr        | qeA              | Ser        | Glu<br>350 | Tyr        | Gln          |
| 35   | Leu               | Pro         | Tyr<br>355 | Val        | Leu        | Gly        | Ser        | <b>Ala</b><br>360 | His        | Gln        | Gly        | Суз              | Pro<br>365 | Pro        | Pro        | Phe          |
| 40   | Pro               | Ala<br>370  | qzA        | Val        | Phe        | Met        | Ile<br>375 | Pro               | Gln        | Tyr        | Gly        | Tyr<br>380       | Leu        | Thr        | Leu        | Asn          |
|      | Asn<br>385        | ely         | Ser        | Gln        | Ala        | Val<br>390 | Gly        | Arg               | Ser        | Ser        | Phe<br>395 | Tyr <sub>.</sub> | Cys        | Leu        | Glu        | Tyr<br>400   |
| 45   | Phe               | Pro         | Ser        | Gln        | Met<br>405 | Arg        | Arg        | Thr               | Gly        | Asn<br>410 | Asn        | Phe              | Glu        | Phe        | Ser<br>415 | Tyr          |
| 50   | Gln               | Phe         | Glu        | Asp<br>420 | Val        | Pro        | Phe :      |                   | Ser<br>425 | Ser        | Tyr        | Ala              | His        | Ser<br>430 | Gln        | Ser          |
| •    | Leu               | qeA         | Arg<br>435 | Leu        | Met        | Asn        |            | Leu<br>440        | Ile .      | qeA        | Gln        | Tyr              | Leu<br>445 | туг        | Tyr        | Leu          |

|    | Sei        | 450        | Thi        | r Gl:      | n Se         | r Th         | r Gl;<br>45 |            | y Th.      | r Ale        | a Gl              | y Th<br>46 |            | n Gl       | n Lei      | ı Let        |
|----|------------|------------|------------|------------|--------------|--------------|-------------|------------|------------|--------------|-------------------|------------|------------|------------|------------|--------------|
| 5  | Phe<br>465 | e Ser      | Gli        | a Ala      | a G1;        | y Pr<br>47   | ASI         | n Ası      | n Me       | t Se         | 47                |            | n Ala      | a Ly       | s Asr      | 1 Trp<br>480 |
| 10 | Leu        | Pro        | G13        | , Pro      | 0 Cys<br>485 | т <b>у</b> : | r Arç       | Glr        | ı Glı      | n Arg<br>490 |                   | l Se       | r Thi      | r Th:      | 195        |              |
|    | Gln        | . Asn      | Asn        | Asr<br>500 | n Ser        | reA :        | Phe         | Ala        | Tr<br>505  |              | : Gly             | / Ala      | a Thi      | 510        | Tyr        | His          |
| 15 | Leu        | Asn        | Gly<br>515 | Arg        | g Asp        | Ser          | Leu         | Val<br>520 |            | A Pro        | Gly               | Va]        | Ala<br>525 |            | : Ala      | Thr          |
| 20 | His        | Lys<br>530 | Asp        | Asp        | Glu          | Glu          | Arg<br>535  |            | Phe        | Pro          | Ser               | Ser<br>540 |            | Val        | Leu        | Met          |
|    | Phe<br>545 | GĴĀ        | Lys        | Gļn        | Gly          | Ala<br>550   | Gly         | Lys        | Ąsp        | Asn          | <b>Val</b><br>555 |            | Tyr        | Ser        | Ser        | Val<br>560   |
| 25 | Met        | Leu<br>'   | Thr        | Ser        | Glu<br>565   | Glu          | Glu         | Ile        | Lys        | Thr<br>570   | Thr               | Asn        | Pro        | Val        | Ala<br>575 | Thr          |
| 30 | Glu        | Gln        | Tyr        | Gly<br>580 | Val          | Val          | Ala         | Asp        | Asn<br>585 | Leu          | Gln               | Gln        | Gln        | Asn<br>590 | Ala        | Ala          |
|    | Pro        | Ile        | Val<br>595 | Gly        | Ala          | Val          | Asn         | Ser<br>600 | Gln        | Gly          | Ala               | Leu        | Pro<br>605 | Gly        | Met        | Val          |
| 35 | Trp        | Gln<br>610 | neA        | Arg        | Asp          | Val          | Tyr<br>615  | Leu        | Gln        | Gly          | Pro               | 11e<br>620 | Trp        | Ala        | Lys        | Ile          |
| 40 | Pro<br>625 | His        | Thr        | Asp        | Gly          | Asn<br>630   | Phe         | His        | Pro        | Ser          | Pro<br>635        | Leu        | Met        | Gly        | Gly        | Phe<br>640   |
|    | Gly        | Leu        | Lys        | His        | Pro<br>645   | Pro          | Pro         | Gln        | Ile        | Leu<br>650   | Ile               | Lys        | Asn        | Thr        | Pro<br>655 | Val          |
| 45 | Pro        | Ala        | qeA        | Pro<br>660 | Pro          | Thr          | Thr         | Phe        | Ser<br>665 | Gln          | Ala               | Lys        | Leu        | Ala<br>670 | Ser        | Phe          |
| 50 | Ile        | Thr        | Gln<br>675 | Tyr        | Ser          | Thr          | Gly         | Gln<br>680 | Val        | Ser          | Val               | Glu        | Ile<br>685 | Glu        | Trp        | Glu          |
|    | Leu        | Gln<br>690 | Lys        | Glu        | Asn          | Ser          | Lys<br>695  | Arg        | Trp        | Asn          | Pro               | Glu<br>700 | Ile        | Gln        | Tyr        | Thr          |
| 55 |            |            |            |            |              |              |             |            |            |              |                   |            |            |            |            |              |

| _           |                                  |            | Se:       | r As:      | n Ty       | r Ty       | r Ly       | 3 Se.<br>71 | r Th       | r As       | n Va       | l As         | P Pho<br>719 |            | a Va       | l As.      | n Th       | r Glu<br>720 |
|-------------|----------------------------------|------------|-----------|------------|------------|------------|------------|-------------|------------|------------|------------|--------------|--------------|------------|------------|------------|------------|--------------|
| 5           |                                  |            | Gly       | Th:        | г Ту:      | r Se       | 72:        | u Pro<br>5  | Ar         | g Pr       | o Il       | e Gl:<br>730 |              | r Ar       | g Ty       | r Le       | Th.        | r Arg<br>5   |
| 10          |                                  |            | Asr       | Let        | <b>.</b>   |            |            |             |            |            |            |              |              |            |            |            |            |              |
| 15          | <210><br><211><br><212><br><213> | 738<br>PRT |           | otein      | of AA\     | V serc     | otype,     | clone ·     | 42.8       |            |            |              |              |            |            |            |            |              |
|             | <400>                            | 85         |           |            |            |            |            |             |            |            |            |              |              |            |            |            |            |              |
| 20          |                                  |            | Met<br>1  | Ala        | Ala        | Asp        | Gly<br>5   | Tyr         | Lev        | Pro        | Asp        | Trp<br>10    | Leu          | Glu        | a Asp      | Asn        | Leu<br>15  | Ser          |
| 25          |                                  |            | Glu       | Gly        | Ile        | Arg<br>20  | Glu        | Trp         | Trp        | Asp        | Leu<br>25  | Lys          | Pro          | Gly        | Ala        | Pro<br>30  | Lys        | Pro          |
|             |                                  |            | Lys       | Ala        | Asn<br>35  | Gln        | Gln        | Lys         | Gln        | Asp<br>40  | Asp        | Gly          | Arg          | Gly        | Leu<br>45  | Val        | Leu        | Pro          |
| <b>30</b> . |                                  |            | Gly       | Tyr<br>50  | Lys        | Туг        | Leu        | GJY         | Pro<br>55  | Phe        | Asn        | Gly          | Leu          | Азр<br>60  | Lys        | ely        | Glu        | Pro          |
| 35          |                                  | ,          | Val<br>65 | Asn        | Ala        | Ala        | qeA        | Ala<br>70   | Ala        | Ala        | Leu        | Glu          | His<br>75    | Asp        | Lys        | λla        | Tyr        | Asp<br>80    |
|             |                                  |            | Gln       | Gln        | Leu        | Lys        | Ala<br>85  | Gly         | qeA        | Asn        | Pro        | Tyr<br>90    | Leu          | Arg        | Tyr        | Asn        | His<br>95  | Ala          |
| 40          |                                  | ,          | qeA       | Ala        | Glu        | Phe<br>100 | Gln        | Glu         | Arg        | Leu        | Gln<br>105 | Glu          | Азр          | Thr        | Ser        | Phe<br>110 | Gly        | Gly          |
| 45          |                                  | ,          | Asn       | Leu        | Gly<br>115 | Arg        | Ala        | Val         | Phe        | Gln<br>120 | Ala        | Lys          | Lys          | Arg        | Val<br>125 | Leu        | Glu        | Pro          |
|             |                                  | I          | eu        | Gly<br>130 | Leu        | Val        | Glu        | Glu         | Gly<br>135 | Ala        | Lys        | Thr          |              | Pro<br>140 | Gly        | Lys        | Lys        | Arg          |
| 50          |                                  | P<br>1     | ro<br>45  | Val        | Glu        | Pro        | Ser        | Pro<br>150  | Gln        | Arg        | Ser        |              | Asp<br>155   | Ser        | Ser        | Thr        |            | Ile<br>160   |
| 55          |                                  | G          | ly:       | Lys        | Thr        | Gly        | Gln<br>165 | Gln         | Pro        | Ala        | Lys        | Lys<br>170   | Arg :        | Leu        | Asn        |            | Gly<br>175 | Gln          |

| Leu Tyr Lys Gln Ile Ser Asn Gly Thr Ser Gly Gly Ser Thr As 260  Asn Thr Tyr Phe Gly Tyr Ser Thr Pro Trp Gly Tyr Phe Asp Pr 275  Arg Phe His Cys His Phe Ser Pro Arg Asp Trp Gln Arg Leu Il 290  Asn Asn Trp Gly Phe Arg Pro Lys Arg Leu Asn Phe Lys Leu Ph 310  Ile Gln Val Lys Glu Val Thr Gln Asn Glu Gly Thr Lys Thr Il 325  Asn Asn Leu Thr Ser Thr Ile Gln Val Phe Thr Asp Ser Glu Ty 340  Leu Pro Tyr Val Leu Gly Ser Ala His Gln Gly Cys Leu Pro 355  Pro Ala Asp Val Phe Met Ile Pro Gln Tyr Gly Tyr Leu Thr Leu 370  Asn Gly Ser Gln Ala Val Gly Arg Ser Ser Phe Tyr Cys Leu Glu Asn Gly Phe Pro Ser Gln Met Leu Arg Thr Gly Asn Asn Phe Glu Phe Ser Ser Phe Pro Glu Phe Ser Ser Ser Ser Ser Ser Phe Glu Phe Ser Ser Ser Ser Ser Ser Ser Ser Ser Se                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | lu Pro        |            | 2 Gly | , Ile | Pro        | Gln        | Pro          | Asp<br>185 | Pro        | Val          | ı Sez        |            | Se:<br>180 | , Ası                  | r Gly        | Th:               |   |    |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|------------|-------|-------|------------|------------|--------------|------------|------------|--------------|--------------|------------|------------|------------------------|--------------|-------------------|---|----|
| Ser ser Gly Asn Trp His Cys Asp Ser Thr Trp Leu Gly Asp A 225  Ser ser Gly Asn Trp His Cys Asp Ser Thr Trp Leu Gly Asp A 235  Ile Thr Thr Ser Thr Arg Thr Trp Ala Leu Pro Thr Tyr Asn A 250  Leu Tyr Lys Gln Ile Ser Asn Gly Thr Ser Gly Gly Ser Thr Arg 260  Asn Thr Tyr Phe Gly Tyr Ser Thr Pro Trp Gly Tyr Phe Asp Pr 280  Asn Thr Tyr Phe Gly Tyr Ser Pro Arg Asp Trp Gln Arg Leu Il 290  Asn Asn Trp Gly Phe Arg Pro Lys Arg Leu Asn Phe Lys Leu Ph 305  Ile Gln Val Lys Glu Val Thr Gln Asn Glu Gly Thr Lys Thr Il 325  Asn Asn Leu Thr Ser Thr Ile Gln Val Phe Thr Asp Ser Glu Ty 340  Leu Pro Tyr Val Leu Gly Ser Ala His Gln Gly Cys Leu Pro Pro 370  Pro Ala Asp Val Phe Met Ile Pro Gln Tyr Gly Tyr Leu Thr Leu 375  Asn Gly Ser Gln Ala Val Gly Arg Ser Ser Phe Tyr Cys Leu Glu 385  Phe Pro Ser Gln Met Leu Arg Thr Gly Asn Asn Phe Glu Phe Ser 405  Gln Phe Glu Asp Val Pro Phe His Ser Ser Tyr Ala His Ser Gln                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | ly Gly        | a Gl       |       |       | Met        | Thr        | Gly          | Ser        | Gly<br>200 | Leu          | Gly          | Se:        | Pro        | Gl <sub>3</sub><br>195 | Ala          | Pro               |   | 5  |
| 15  11e Thr Thr Ser Thr Arg Thr Trp Ala Leu Pro Thr Tyr Asn Arger Thr Trp Ala Leu Pro Thr Tyr Asn Arger Thr Trp Ala Leu Pro Thr Tyr Asn Arger Thr Arger Thr Trp Ala Leu Pro Thr Tyr Asn Arger Thr Arger Thr Ser Gly Gly Ser Thr Arger Thr Trp Ala Leu Pro Trp Gly Ser Thr Arger Thr Trp Ala Leu Pro Trp Gly Tyr Phe Asp Pro 275  Asn Thr Tyr Phe Gly Tyr Ser Thr Pro Trp Gly Tyr Phe Asp Pro 285  Arger Phe His Cys His Phe Ser Pro Arger Asp Trp Gln Arger Leu Il 290  Asn Asn Trp Gly Phe Arger Pro Lys Arger Leu Asn Phe Lys Leu Phe 310  11e Gln Val Lys Glu Val Thr Gln Asn Glu Gly Thr Lys Thr Il 325  Asn Asn Leu Thr Ser Thr Ile Gln Val Phe Thr Asp Ser Glu Ty 340  Leu Pro Tyr Val Leu Gly Ser Ala His Gln Gly Cys Leu Pro Pro 355  Pro Ala Asp Val Phe Met Ile Pro Gln Tyr Gly Tyr Leu Thr Leu 375  Asn Gly Ser Gln Ala Val Gly Arger Ser Ser Phe Tyr Cys Leu Glu 385  Sephe Pro Ser Gln Met Leu Arger Thr Gly Asn Asn Phe Glu Phe Ser 405  Gln Phe Glu Asp Val Pro Phe His Ser Ser Tyr Ala His Ser Gln                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | ly Ser        | ı Gl       | ' Val |       |            | Ala        | Gly          | Glu        | Asn        | Asn<br>215   | qeA .        | : Ala      | Met        | Pro                    | Ala<br>210   | Gly               |   | 10 |
| Ile Thr Thr Ser Thr Arg Thr Trp Ala Leu Pro Thr Tyr Asn And Arg 245   Leu Tyr Lys Gln Ile Ser Asn Gly Thr Ser Gly Gly Ser Thr Arg 260   Asn Thr Tyr Phe Gly Tyr Ser Thr Pro Trp Gly Tyr Phe Asp Pro 275   Arg Phe His Cys His Phe Ser Pro Arg Asp Trp Gln Arg Leu Il 290   Asn Asn Trp Gly Phe Arg Pro Lys Arg Leu Asn Phe Lys Leu Phe 305   Asn Asn Trp Gly Phe Arg Pro Lys Arg Leu Asn Phe Lys Leu Phe 305   Asn Asn Leu Thr Ser Thr Ile Gln Asn Glu Gly Thr Lys Thr Ile Gln Val Lys Glu Val Thr Gln Asn Glu Gly Thr Lys Thr Ile Gln Val Phe Thr Asp Ser Glu Ty 340   Leu Pro Tyr Val Leu Gly Ser Ala His Gln Gly Cys Leu Pro Pro 355   Asn Gly Ser Gln Ala Val Gly Arg Ser Ser Phe Tyr Cys Leu Glu 385   Asn Gly Ser Gln Ala Val Gly Arg Ser Ser Phe Tyr Cys Leu Glu 385   Asn Gly Ser Gln Met Leu Arg Thr Gly Asn Asn Phe Glu Phe Ser Gln Phe Glu Asp Val Pro Phe His Ser Ser Tyr Ala His Ser Gln Phe Glu Asp Val Pro Phe His Ser Ser Tyr Ala His Ser Gln Gln Phe Glu Asp Val Pro Phe His Ser Ser Tyr Ala His Ser Gln Gln Phe Glu Asp Val Pro Phe His Ser Ser Tyr Ala His Ser Gln Gln Phe Glu Asp Val Pro Phe His Ser Ser Tyr Ala His Ser Gln                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | rg Val<br>240 | P Ar       | Asp   | Gly   | Leu        |            | Thr          | Ser        | Asp        | Суз          | His<br>230   | Trp        | ne.A       | ely                    | Ser          | Ser<br>225        |   | 16 |
| Ash Thr Tyr Phe Gly Tyr Ser Thr Pro Trp Gly Tyr Phe Asp Pro 275  Arg Phe His Cys His Phe Ser Pro Arg Asp Trp Gln Arg Leu Il 295  Ash Ash Trp Gly Phe Arg Pro Lys Arg Leu Ash Phe Lys Leu Phe 310  Ash Ash Trp Gly Phe Arg Pro Lys Arg Leu Ash Phe Lys Leu Phe 325  Ash Ash Leu Thr Ser Thr Ile Gln Ash Glu Gly Thr Lys Thr Il 335  Ash Ash Leu Thr Ser Thr Ile Gln Val Phe Thr Asp Ser Glu Ty 340  Leu Pro Tyr Val Leu Gly Ser Ala His Gln Gly Cys Leu Pro Pro 355  Pro Ala Asp Val Phe Met Ile Pro Gln Tyr Gly Tyr Leu Thr Leu 370  Ash Gly Ser Gln Ala Val Gly Arg Ser Ser Phe Tyr Cys Leu Glu 385  Phe Pro Ser Gln Met Leu Arg Thr Gly Ash Ash Phe Glu Phe Ser 405  Gln Phe Glu Asp Val Pro Phe His Ser Ser Tyr Ala His Ser Gln Gln Phe Glu Asp Val Pro Phe His Ser Ser Tyr Ala His Ser Gln Gln Phe Glu Asp Val Pro Phe His Ser Ser Tyr Ala His Ser Gln Gln Phe Glu Asp Val Pro Phe His Ser Ser Tyr Ala His Ser Gln                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |               | 25:        | neA   | Tyr   | Thr        | Pro        | Leu<br>250   | Ala        | Trp        | Thr          | Arg          | Thr<br>245 | Ser        | Thr                    | Thr          | Ile               |   | 15 |
| 275  Arg Phe His Cys His Phe Ser Pro Arg Asp Trp Gln Arg Leu Ill 290  Asn Asn Trp Gly Phe Arg Pro Lys Arg Leu Asn Phe Lys Leu Ph 310  Ile Gln Val Lys Glu Val Thr Gln Asn Glu Gly Thr Lys Thr Ill 325  Asn Asn Leu Thr Ser Thr Ile Gln Val Phe Thr Asp Ser Glu Ty 340  Leu Pro Tyr Val Leu Gly Ser Ala His Gln Gly Cys Leu Pro 375  Pro Ala Asp Val Phe Met Ile Pro Gln Tyr Gly Tyr Leu Thr Leu 375  Asn Gly Ser Gln Ala Val Gly Arg Ser Ser Phe Tyr Cys Leu Glu 385  Phe Pro Ser Gln Met Leu Arg Thr Gly Asn Asn Phe Glu Phe Ser 415  Gln Phe Glu Asp Val Pro Phe His Ser Ser Tyr Ala His Ser Gln Glu Phe Ser Gln Phe Glu Asp Val Pro Phe His Ser Ser Tyr Ala His Ser Gln Gln Phe Glu Asp Val Pro Phe His Ser Ser Tyr Ala His Ser Gln                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | ın Asp        |            |       | Ser   | Gly        | Gly        | Ser          | Thr<br>265 | Gly        | neA          | Ser          | Ile        | Gln<br>260 | Lys                    | Tyr          | Leu               |   | 20 |
| Arg Phe His Cys His Phe Ser Pro Arg Asp Trp Gln Arg Leu Il 290  Asn Asn Trp Gly Phe Arg Pro Lys Arg Leu Asn Phe Lys Leu Ph 310  Ile Gln Val Lys Glu Val Thr Gln Asn Glu Gly Thr Lys Thr Il 32  Asn Asn Leu Thr Ser Thr Ile Gln Val Phe Thr Asp Ser Glu Ty 340  Leu Pro Tyr Val Leu Gly Ser Ala His Gln Gly Cys Leu Pro Pro Ala Asp Val Phe Met Ile Pro Gln Tyr Gly Tyr Leu Thr Leu 370  Asn Gly Ser Gln Ala Val Gly Arg Ser Ser Phe Tyr Cys Leu Glu 385  Phe Pro Ser Gln Met Leu Arg Thr Gly Asn Asn Phe Glu Phe Ser 415  Gln Phe Glu Asp Val Pro Phe His Ser Ser Tyr Ala His Ser Gln Glu Phe Glu Phe Ser 415                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | ie Asn        | ) Phe      | Asp   |       | Tyr        | Gly        | Trp          | Pro        | Thr<br>280 | Ser          | Tyr          | Gly        | Phe        | Tyr<br>275             | Thr          | Asn               |   | 25 |
| Ile Gln Val Lys Glu Val Thr Gln Asn Glu Gly Thr Lys Thr Il 325  Asn Asn Leu Thr Ser Thr Ile Gln Val Phe Thr Asp Ser Glu Ty 340  Leu Pro Tyr Val Leu Gly Ser Ala His Gln Gly Cys Leu Pro Pro 355  Pro Ala Asp Val Phe Met Ile Pro Gln Tyr Gly Tyr Leu Thr Leu 370  Asn Gly Ser Gln Ala Val Gly Arg Ser Ser Phe Tyr Cys Leu Glu 385  Phe Pro Ser Gln Met Leu Arg Thr Gly Asn Asn Phe Glu Phe Ser 405  Gln Phe Glu Asp Val Pro Phe His Ser Ser Tyr Ala His Ser Gln Gln Phe Glu Phe Glu Phe Gln Ph | neA s.        | Ile        | Leu   | Arg   | Gln<br>300 | Trp        | Asp          | Arg .      | Pro .      | Ser<br>295   | Phe          | His        | Суз        | His                    | Phe<br>290   | Arg               |   |    |
| Asn Asn Leu Thr Ser Thr Ile Gln Val Pro Phe His Ser Ser Tyr Ala His Ser Glu Pro Gln Phe Glu Asp Val Pro Phe His Ser Ser Tyr Ala His Ser Glu Phe Glu Asp Val Pro Phe His Ser Ser Tyr Ala His Ser Gln Pro Gln Pro Gln Phe Glu Asp Val Pro Phe His Ser Ser Tyr Ala His Ser Gln Pro Gln Phe Glu Asp Val Pro Phe His Ser Ser Tyr Ala His Ser Gln Pro Gln Phe Glu Asp Val Pro Phe His Ser Ser Tyr Ala His Ser Gln In Inches In | e Asn<br>320  | Phe        | Leu   | Lys   | Phe        | Asn<br>315 | Leu .        | \rg        | bys i      | Pro          | Arg<br>310   | Phe        | Gly        | Trp                    | Asn          | <b>neA</b><br>305 |   | 30 |
| Asn Asn Leu Thr Ser Thr Ile Gln Val Phe Thr Asp Ser Glu Ty 340  Leu Pro Tyr Val Leu Gly Ser Ala His Gln Gly Cys Leu Pro Pro 365  Pro Ala Asp Val Phe Met Ile Pro Gln Tyr Gly Tyr Leu Thr Leu 375  Asn Gly Ser Gln Ala Val Gly Arg Ser Ser Phe Tyr Cys Leu Glu 385  Phe Pro Ser Gln Met Leu Arg Thr Gly Asn Asn Phe Glu Phe Ser 405  Gln Phe Glu Asp Val Pro Phe His Ser Ser Tyr Ala His Ser Gln                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |               | Ile<br>335 | Thr   | Lys   | Thr        | Gly        | 51u (<br>330 | sn (       | ln i       | Thr          | Val          | Glu<br>325 | Lys        | Val                    | Gln          | Ile               |   | 35 |
| Pro Ala Asp Val Phe Met Ile Pro Gln Tyr Gly Tyr Leu Thr Leu 370  Asn Gly Ser Gln Ala Val Gly Arg Ser Ser Phe Tyr Cys Leu Glu 385  Phe Pro Ser Gln Met Leu Arg Thr Gly Asn Asn Phe Glu Phe Ser 405  Gln Phe Glu Asp Val Pro Phe His Ser Ser Tyr Ala His Ser Gln                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | r Gln         | Tyr        |       |       | Asp        | Thr :      | ?he :        | al :       | ln V       | Ile          | Thr          | Ser        | Thr<br>340 | Leu                    | Asn          | neA               |   |    |
| Asn Gly Ser Gln Ala Val Gly Arg Ser Ser Phe Tyr Cys Leu Glu 385  Phe Pro Ser Gln Met Leu Arg Thr Gly Asn Asn Phe Glu Phe Ser 405  Gln Phe Glu Asp Val Pro Phe His Ser Ser Tyr Ala His Ser Gln                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | o Phe         | Pro        | Pro   |       |            | Sly (      | Sln (        | is (       | la F<br>60 | Ser :        | Gly          | Leu        | Val        | Tyr<br>355             | Pro          | Leu               |   | 40 |
| Asn Gly Ser Gln Ala Val Gly Arg Ser Ser Phe Tyr Cys Leu Glu 385  Phe Pro Ser Gln Met Leu Arg Thr Gly Asn Asn Phe Glu Phe Ser 405  Gln Phe Glu Asp Val Pro Phe His Ser Ser Tyr Ala His Ser Gln                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | ı Asn         | Leu        | Thr   | Leu : |            |            | yr G         | ln I       | ro G       | [le ]<br>375 | Met          | Phe        | Val        | qeA                    | Ala .<br>370 | Pro               |   | 45 |
| Gln Phe Glu Asp Val Pro Phe His Ser Ser Tyr Ala His Ser Gln                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 1 Tyr<br>400  | Glu        | Leu   | Cys I | Yr (       |            |              | er S       | rg S       | ;ly ;        | Val (<br>390 | Ala        | Sln .      | Ser (                  | Gly :        | Asn<br>385        |   | 40 |
| Gln Phe Glu Asp Val Pro Phe His Ser Ser Tyr Ala His Ser Gln                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |               | Ser<br>415 |       | alu E | he G       | sn E       |              |            | hr G       | urg I        | Leu 1        | Met<br>405 | Sln i      | Ser (                  | Pro :        | Phe               |   | 50 |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Ser           | Gln        |       |       | la F       | yr A       | er T         |            |            | he H         | Pro 1        | Val        | Asp '      | Glu /                  | Phe (        | Gln               | ì | 55 |

| 5  |   | Leu        | qeA :      | Arg<br>435 |            | Met        | neA :      | Pro        | 440        |            | qeA :      | Gln               | Tyr        | Leu<br>445 | _          | Туг        | Leu               |
|----|---|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|-------------------|------------|------------|------------|------------|-------------------|
|    |   | Ser        | Arg<br>450 |            | Gln        | Ser        | Thr        | Gly<br>455 | _          | Thr        | Ala        | Gly               | Thr<br>460 |            | Gln        | Leu        | Leu               |
| 10 | • | Phe<br>465 |            | Gln        | Ala        | Gly        | Pro<br>470 |            | ne.A       | Met        | Ser        | Ala<br>475        | Gln        | Ala        | Lys        | neA        | Trp<br>480        |
| 15 |   | Leu        | Pro        | Gly        | Pro        | Cys<br>485 |            | Arg        | Gln        | Gln        | Arg<br>490 | Val               | Ser        | Thr        | Thr        | Leu<br>495 | Ser               |
| 75 |   | Gln        | Asn        | aeA        | Asn<br>500 | Ser        | Asn        | Phe        | Ala        | Trp<br>505 |            | Gly               | Ala        | Thr        | Lys<br>510 | Tyr        | His               |
| 20 |   | Leu        | Asn        | Gly<br>515 | Arg        | Asp        | Ser        | Leu        | Val<br>520 | neA        | Pro        | Gly               | Val        | Ala<br>525 | Met        | Ala        | Thr               |
| 25 |   | His        | Lys<br>530 | Asp        | Asp        | Glu        | Glu        | Arg<br>535 | Phe        | Phe        | Pro        | Ser               | Ser<br>540 | Gly        | Val        | Leu        | Met               |
| 23 |   | Phe<br>545 |            | Lys        | Gln        | Gly        | Ala<br>550 | Gly        | Lys        | Asp        | Asn        | <b>Val</b><br>555 | Asp        | Tyr        | Ser        | Ser        | <b>Val</b><br>560 |
| 30 |   | Met        | Leu        | Thr        | Ser        | Glu<br>565 | Glu        | Glu        | Ile        | ГУз        | Thr<br>570 | Thr               | Asn        | Pro        | Val        | Ala<br>575 | Thr               |
| 25 |   | Glu        | Gln        | Tyr        | Gly<br>580 | Val        | Val        | Ala        | ДSр        | Asn<br>585 | Leu        | Gln               | Gln        | Gln        | Asn<br>590 | Ala        | Ala               |
| 35 |   | Pro        | Ile        | Val<br>595 | Gly        | Ala        | Val        | Asn        | Ser<br>600 | Gln        | Gly        | Ala               | Leu        | Pro<br>605 | Gly        | Met        | Val               |
| 40 |   | Trp        | Gln<br>610 | Asn        | Arg        | Asp        | Val        | Tyr<br>615 | Leu        | Gln        | Gly        | Pro               | Ile<br>620 | Trp.       | Ala        | Lys        | Ile               |
|    |   | Pro<br>625 | His        | Thr        | Asp        | Gly        | Asn<br>630 | Phe        | His        | Pro        | Ser        | Pro<br>635        | Leu        | Met        | Gly        | еĵу        | Phe<br>640        |
| 45 |   | Gly        | Leu        | Lys        | His        | Pro<br>645 | Pro        | Pro        | Gln        | Ile        | Leu<br>650 | Ile               | Lys        | Asn        | Thr        | Pro<br>655 | Val               |
| 50 |   | Pro        | Ala        | Asp        | Pro<br>660 | Pro        | Thr        | Thr        | Phe        | Ser<br>665 | Gln        | Ala               | Lys        | Leu        | Ala<br>670 | Ser        | Phe               |
|    | • | Ile        | Thr        | Gln<br>675 | Tyr        | Ser        | Thr        | Gly        | Gln<br>680 | Val        | Ser        | Val               | Glu        | Ile<br>685 | Glu        | Trp        | Glu               |
| 55 |   |            |            |            |            |            |            |            |            |            |            |                   |            |            |            |            |                   |

| _         |                                                           | Leu        | Gln<br>690 | Lуз   | Glu    | Asn        | Ser        | Lys<br>695 | Arg | Trp | Asn        | Pro        | Glu<br>700 | Ile      | Gln | Tyr        | Thr        |
|-----------|-----------------------------------------------------------|------------|------------|-------|--------|------------|------------|------------|-----|-----|------------|------------|------------|----------|-----|------------|------------|
| 5         |                                                           | Ser<br>705 | Asn        | Tyr   | Tyr    | Lys        | Ser<br>710 | Thr        | neA | Val | Asp        | Phe<br>715 | Ala        | Val      | Asn | Thr        | Glu<br>720 |
| 10        |                                                           | Gly        | Thr        | Tyr   | Ser    | Glu<br>725 | Pro        | Arg        | Pro | Ile | Gly<br>730 | Thr        | Arg        | ,<br>Tyr | Leu | Thr<br>735 | Arg        |
|           |                                                           | Asn        | Leu        |       |        |            |            |            |     |     |            |            |            |          |     |            |            |
| 15        |                                                           |            |            |       | ٠      |            |            |            |     |     |            |            |            |          |     |            |            |
| 20        | <210> 86<br><211> 733<br><212> PR<br><213> am<br><400> 86 | 3<br>.T    | id of A    | AV se | erotyp | e, clor    | ne 42.     | 13         |     |     |            |            |            |          |     |            |            |
| 25        |                                                           |            |            |       |        |            |            |            |     |     |            |            |            |          |     |            |            |
| 30        |                                                           |            |            |       |        |            |            |            |     |     |            |            |            |          |     |            |            |
| <i>35</i> |                                                           |            |            |       |        |            |            |            |     |     |            |            |            |          |     |            |            |

|            | Met<br>1   | Ala        | Ala         | Asp        | G1y<br>5   | туг        | Leu        | Pro        | Asp        | Trp<br>10  | Leu        | Glu        | Asp        | neA ·      | Leu<br>15  | Ser        |
|------------|------------|------------|-------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| 5          | Glu        | Gly        | Ile         | Arg<br>20  | Glu        | Trp        | Trp        | qeA        | Leu<br>25  | Lys        | Pro        | Gly        | Ala        | Pro<br>30  | Lys        | Pro        |
| 10         | Lys        | Ala        | Asn<br>35   | Gln        | Gln        | Lys        | Gln        | Asp<br>40  | qeA        | Gly        | Arg        | Gly        | Leu<br>45  | Val        | Leu        | Pro        |
| ٠          | eĵà        | Туr<br>50  | Lys         | Tyr        | Leu        | Gly        | Pro<br>55  | Phe        | neA        | Gly        | Leu        | Asp<br>00  | Lys        | Gly        | Glu        | Pro        |
| 15         | Val<br>65  | Asn        | Ala         | Ala        | Asp        | Ala<br>70  | Ala        | Ala        | Leu        | Glu        | His<br>75  | Asp        | Lys        | Ala        | Tyr        | Asp<br>80  |
| 20         | Gln        | Gln        | Leu         | Lys        | Ala<br>85  | Gly        | Asp        | Asn        | Pro        | Tyr<br>90  | Leu        | Arg        | Tyr        | Asn        | His<br>95  | Ala        |
|            | Asp        | Ala        | Glu         | Phe<br>100 | Gln        | Glu        | Arg        | Leu        | Gln<br>105 | Glu        | Asp        | Thr        | Ser        | Phe<br>110 | Gly        | Gly        |
| 25         | Asn        | Leu        | Gly<br>115  | Arg        | Ala        | Val        | Phe        | Gln<br>120 | Ala        | Lys        | Lys        | Arg        | Val<br>125 | Leu        | Glu        | Pro        |
| 30         | . Leu      | Gly<br>130 | Leu         | Val        | Glu        | Glu        | Gly<br>135 | Ala        | Lys        | Thr        | Ala        | Pro<br>140 | Gly        | Lys        | Lys        | Arg        |
|            | Pro<br>145 | Ile        | <b>G</b> Jπ | Ser        | Pro        | Asp<br>150 | Ser        | Ser        | Thr        | Gly        | Ile<br>155 | Gly        | Lys        | Lys        | Gly        | Gln<br>160 |
| 35         | Gln        | Pro        | Ala         | ГÀз        | Lys<br>165 | Lys        | Leu        | Asn        |            | Gly<br>170 | Gln        | Thr        | ely        | Asp        | Ser<br>175 | Glu        |
| <b>4</b> 0 |            |            |             |            | •          |            |            |            |            |            |            |            |            |            |            |            |
|            |            |            |             |            |            |            |            |            |            |            |            |            |            |            |            |            |

|            | Se         | r Va       | l Pro        | 181<br>181 | Pro          | o G1:      | n Pr       | 0 Il       | e G1<br>18 |            | u Pr         | o Pr       | o Al        | a Gl       |            | o Ser        |
|------------|------------|------------|--------------|------------|--------------|------------|------------|------------|------------|------------|--------------|------------|-------------|------------|------------|--------------|
| 5          | Gly        | y Le       | u Gly<br>195 | y Sei      | : G13        | y Thi      | r Mei      | 20         | a Al<br>0  | a Gl       | y Gly        | / Gly      | y Ala<br>20 |            | o Me       | t Ala        |
| 10         | Asp        | 210        | n Asr        | ı Glu      | ı Gly        | / Ala      | 215        | G Gly      | y Va       | 1 G1;      | y Sei        | 220        |             | r Gly      | y As:      | n Trp        |
|            | His<br>225 | Cys        | qeA 8        | Ser        | Thr          | 7rg<br>230 | )<br>Lev   | ı Gly      | / Ası      | e Arg      | 7 Val<br>235 |            | th:         | Thi        | : Se:      | r Thr<br>240 |
| 15         | Arg        | Thr        | Trp          | Ala        | Leu<br>245   | Pro        | Thr        | Туг        | : Ası      | Asr<br>250 |              | Leu        | Туг         | Lys        | Gl:<br>255 | n Ile        |
| 20         | Ser        | Asn        | Gly          | Thr<br>260 | Ser          | Gly        | , elà      | Ser        | Thr<br>265 | : Asn      | Asp          | Asn        | Thr         | Tyr<br>270 |            | e ely        |
| ·          | Tyr        | Ser        | Thr<br>275   | Pro        | Trp          | Gly        | Туг        | Phe<br>280 | Asp        | Phe        | Asn          | Arg        | Phe<br>285  |            | Суз        | His          |
| 25         | Phe        | Ser<br>290 | Pro          | Arg        | qeA          | Trp        | Gln<br>295 | Arg        | Leu        | Ile        | Asn          | Asn<br>300 | neA         | Trp        | Gly        | Phe          |
| 3 <b>0</b> | Arg<br>305 | Pro        | Lys          | Arg        | Leu          | Asn<br>310 | Phe        | Lys        | Leu        | Phe        | Asn<br>315   | Ile        | Gln         | Val        | Lys        | Glu<br>320   |
|            | Val        | Thr        | Gln          | Asn        | Glu<br>325   | Gly        | Thr        | Lys        | Thr        | Ile<br>330 | Ala          | Asn        | neA         |            | Thr<br>335 | Ser          |
| 35         | Thr        | Ile        | Gln          | Val<br>340 | Phe          | Thr        | Asp        | Ser        | Glu<br>345 | Tyr        | Gln          | Leu        | Pro         | Tyr<br>350 | Val        | Leu          |
| 40         | Gly        | Ser        | Ala<br>355   | His        | Gln          | Gly        | Суз        | Leu<br>360 | Pro        | Pro        | Phe          | Pro        | Ala<br>365  | Asp        | Val        | Phe          |
|            | Met        | Ile<br>370 | Pro          | Gln        | Tyr          | ely        | Tyr<br>375 | Leu        | Thr        |            | Asn          |            |             | Ser        | Gln        | Ala          |
| 45         | Val<br>385 | Gly        | Arg          | Ser        | Ser          | Phe<br>390 | Tyr        | Cys        | Leu        |            | Tyr<br>395   | Phe        | Pro         | Ser        | Gln        | Met<br>400   |
| 50         | Leu i      | Arg        | Thr          | Gly :      | Asn 1<br>405 | Asn        | Phe        | Glu        | Phe        | Ser<br>410 | Tyr (        | Gln        | Phe         | Glu        | Asp<br>415 | Val          |
|            | Pro 1      | Phe :      | His :        | ser :      | Ser :        | fyr .      | Ala 1      |            | Ser<br>425 | Gln        | Ser 1        | Leu :      |             | Arg<br>430 | Leu        | Met          |

|    |   | Asn         | Pro        | Leu<br>435 |            | Asp        | Gln        | Туг        | Leu<br>440 |            | Tyr        | Leu        | Ser        | Arg<br>445 | Thr        | Gln        | Ser        |
|----|---|-------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| 5  |   | Thr         | Gly<br>450 |            | Thr        | Ala        | Gly        | Th:<br>455 |            | . Gln      | Leu        | Leu        | Phe<br>460 |            | Gln        | Ala        | Gly        |
| 10 |   | Pro<br>465  |            | Asņ        | Met        | Ser        | Ala<br>470 |            | Ala        | Lys        | neA :      | Trp<br>475 |            | Pro        | Gly        | Pro        | Cys<br>480 |
|    |   | Tyr         | Arg        | Gln        | Gln        | Arg<br>485 | Val        | Ser        | Thr        | Thr        | Val<br>490 | Ser        | Gln        | neA        | Asn        | Asn<br>495 | Ser        |
| 15 |   | Asn         | Phe        | Ala        | Trp<br>500 | Thr        | Gly        | Ala        | Thr        | Lys<br>505 | _          | His        | Leu        | Asn        | Gly<br>510 | Arg        | Asp        |
| 20 |   | Ser         | Leu        | Val<br>515 | Asn        | Pro        | Gly        | Val        | Ala<br>520 | Met        | Ala        | Thr        | His        | Lys<br>525 | Gly        | Asp        | Glu        |
| 25 |   | €1 <i>n</i> | Arg<br>530 | Phe        | Phe        | Pro        | Ser        | Ser<br>535 | Gly        | Val        | Leu        | Met        | Phe<br>540 | Gly        | ГÀЗ        | Gln        | Gly        |
| 25 |   | Ala<br>545  | Gly        | Lys        | qeA        | Asn        | Val<br>550 | qeA        | Tyr        | Ser        | Ser        | Val<br>555 | Met        | Leu        | Thr        | Ser        | Glu<br>560 |
| 30 |   | Glu         | Glu        | Ile        | Lys        | Thr<br>565 | Thr        | Asn        | Pro        | Val        | Ala<br>570 | Thr        | Glu        | Gln        | Tyr        | Gly<br>575 | Val        |
| 25 |   | Val         | Ala        | Asp        | Asn<br>580 | Leu        | Gln        | Gln        | Gln        | 785<br>285 | Ala        | Ala        | Pro        | Ile        | Val<br>590 | Gly        | Ala        |
| 35 |   | Val         | Asn        | 9er<br>595 | Gln        | GJÀ        | Ala        | Leu        | Pro<br>600 | Gly        | Met        | Val        | Trp        | Gln<br>605 | Asn        | Arg        | Asp        |
| 40 |   | Val         | Tyr<br>610 | Leu        | Gln        | Gly        | Pro        | Ile<br>615 | Trp        | Ala        | Lys        | Ile        | Pro<br>620 | His        | Thr        | qeA        | Gly        |
| 45 |   | Asn<br>625  | Phe        | His        | Pro        | Ser        | Pro<br>630 | Leu        | Met        | Gly        | Gly        | Phe<br>635 | Gly        | Leu        | Lys        | His        | Pro<br>640 |
| 45 |   | Pro         | Pro        | Gln        | Ile        | Leu<br>645 | Ile        | Lys        | aeA        | Thr        | Pro<br>650 | Val        | Pro        | Ala        | Asp        | Pro<br>655 | Pro        |
| 50 |   | Thr         | Thr        | Phe        | Ser<br>660 | Gln        | Ala        | Lys        | Leu        | Ala<br>665 | Ser        | Phe        | Ile        | Thr        | Gln<br>670 | Tyr        | Ser        |
| ·  | * | Thr         | Gly        | Gln<br>675 | Val        | Ser        | Val        | Glu        | Ile<br>680 | Glu        | Trp        | Glu        | Leu        | Gln<br>685 | Lys        | Glu        | Asn        |

Ser Lys Arg Trp Asn Pro Glu Ile Gln Tyr Thr Ser Asn Tyr Tyr Lys 690 695 700

|    |                                              | Ser<br>705 | Thr    | asA   | Val    | Asp        | Phe<br>710 | Ala   | Val | Asn | Thr        | Glu<br>715 | Gly | Thr | Tyr | Ser | Glu<br>720 |
|----|----------------------------------------------|------------|--------|-------|--------|------------|------------|-------|-----|-----|------------|------------|-----|-----|-----|-----|------------|
| 10 |                                              | Pro        | Arg    | Pro   | Ile    | Gly<br>725 | Thr        | Arg   | Tyr | Leu | Thr<br>730 | Arg        | Ser | Leu |     |     |            |
| 15 | <210> 87<br><211> 73<br><212> PR<br><213> ca | 3<br>?T    | rotein | of AA | V serc | otype,     | cione      | 42.3A | i.  |     |            |            |     |     |     |     |            |
| 20 | <400> 87                                     |            |        |       |        |            |            |       |     |     |            |            |     |     |     |     |            |
| 25 |                                              |            |        | · • • |        |            |            |       |     |     |            |            |     |     |     |     |            |
| 30 |                                              |            |        |       |        |            |            |       |     |     |            |            |     |     |     |     |            |
| 35 |                                              |            |        |       |        |            |            |       |     |     |            |            |     |     |     |     |            |
| 40 |                                              |            |        |       |        |            |            |       |     |     |            |            |     |     |     |     |            |
| 45 |                                              |            |        |       |        |            | •          |       |     |     |            |            |     |     |     |     |            |
| 50 |                                              |            |        |       |        |            |            |       |     |     |            |            |     |     |     |     |            |
| 55 |                                              |            |        |       |        |            |            |       |     |     |            |            |     |     |     |     |            |

|    | Met<br>1   | : Ale      | Ala        | qeA        | Gly<br>5   | His        | Lev                | Pro              | Asp        | Trp<br>10    | Leu        | Glu        | l Asp      | Asn        | Leu<br>15  | Ser        |
|----|------------|------------|------------|------------|------------|------------|--------------------|------------------|------------|--------------|------------|------------|------------|------------|------------|------------|
| 5  | Glu        | Gly        | Ile        | Arg<br>20  | Glu        | Trp        | Trp                | Asp              | Leu<br>25  | Lys          | Pro        | ely        | Ala        | Pro<br>30  | Lys        | Pro        |
| 10 | Lys        | Ala        | Asn<br>35  | Gln        | Gln        | Lys        | Сſл                | <b>Аэр</b><br>40 | Asp        | GŢĀ          | Arg        | ely        | Leu<br>45  | Val        | Leu        | Pro        |
|    | Gly        | Tyr<br>50  | Lys        | Tyr        | Leu        | Gly        | Pro<br>55          | Phe              | Asn        | Gly          | Leu        | Asp<br>60  | Lys        | Gly        | Glu        | Pro        |
| 15 | Val<br>65  | neA        | Ala        | Ala        | Asp        | Ala<br>70  | Ala                | Ala              | Leu        | Glu          | His<br>75  | Asp        | Lys        | Ala        | Tyr        | Asp<br>80  |
| 20 | Gln        | Gln        | Leu        | Lys        | Ala<br>85  | Gly        | Asp                | Asn              | Pro        | Tyr<br>90    | Leu        | Arg        | Tyr        | Asn        | His<br>95  | Ala        |
|    | Ąsp        | Ala        | Glu        | Phe<br>100 | Gln        | Glu        | Arg                | Leu              | Gln<br>105 | Glu          | <b>Asp</b> | Thr        | Ser        | Phe<br>110 | Gly        | Gly        |
| 25 | Asn        | Leu        | Gly<br>115 | Arg        | Ala        | Val        | Phe                | Gln<br>120       | Ala        | Lys          | Lys        | Arg        | Val<br>125 | Leu        | Glu        | Pro        |
| 30 | Leu        | Gly<br>130 | Leu        | Val        | G]n        | Glu        | Gl <b>y</b><br>135 | Ala              | Lys        | Thr          | Ala        | Pro<br>140 | Gly        | Lys        | Lys        | Arg        |
|    | Pro<br>145 | Ile        | Glu        | Ser        | Pro        | Asp<br>150 | Ser                | Ser              | Thr        | Gly          | Iľe<br>155 | Gly        | Lys        | Lys        |            | Gln<br>160 |
| 35 | Gln        | Pro .      | Ala :      | Lya :      | Lys<br>165 | Lys        | Leu                | Asn              | Phe        | Gly  <br>170 | Gln        | Thr        | Gly        |            | Ser<br>175 | Glu        |
|    | Ser        | Val        | Pro :      | Asp<br>180 | Pro        | Gln        | Pro                | Ile              | Gly<br>185 | Glu :        | Pro        | Pro        |            | Gly<br>190 | Pro :      | Ser        |
| 40 |            |            |            |            |            |            |                    |                  |            |              |            |            |            |            |            |            |

| 5  | G1;        | y Le       | u Gly<br>195 | y Se.<br>5 | r Gl       | y Thi      | r Me       | 200        |            | a Gl       | y G1       | y Gl       | y Ala<br>20 | _          | o Me       | t Ala      |
|----|------------|------------|--------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|-------------|------------|------------|------------|
|    | Ası        | 210        | n Asr        | ı Glı      | u Gly      | y Ala      | 215        |            | y Va       | l Gly      | y Se       | 2 Se       |             | c Gl       | y Ası      | Trp        |
| 10 | His<br>225 | s Cys      | a Asp        | Se         | r Thi      | 230        |            | ı Gly      | / Asj      | o Arg      | y Va.      |            | e Thi       | Th:        | r Sei      | Thr<br>240 |
| 15 | Arg        | Thr        | : Trp        | Ala        | 245        |            | Thr        | Tyr        | : Ası      | 250        |            | • Le       | u Tyr       | Ly         | Gln<br>255 | Ile        |
|    | Ser        | : Asn      | Gly          | Thr<br>260 | Ser        | Gly        | Gly        | ' Ser      | Thr<br>265 |            | Asp        | eA o       | n Thr       | Tyz<br>270 |            | Gly        |
| 20 | Tyr        | Ser        | Thr<br>275   | Pro        | Trp        | Gly        | Tyr        | Phe<br>280 |            | Phe        | Asn        | Arç        | Phe<br>285  |            | Суз        | His        |
| 25 | Phe        | Ser<br>290 | Pro          | Arg        | Asp        | Trp        | Gln<br>295 |            | Leu        | Ile        | Asn        | 300        |             | Trp        | Gly        | Phe        |
|    | Arg<br>305 | Pro        | Lys          | Arg        | Leu        | Asn<br>310 | Phe        | Lys        | Leu        | Phe        | Asn<br>315 |            | Gln         | Val        | Lys        | Glu<br>320 |
| 30 | Val        | Thr        | Gln          | aeA        | Glu<br>325 | Gly        | Thr        | Lys        | Thr        | Ile<br>330 | Ala        | neA        | Asn         | Leu        | Thr<br>335 | Ser        |
| 35 | Thr        | Ile        | Gln          | Val<br>340 | Phe        | Thr        | qeA        | Ser        | Glu<br>345 | Tyr        | Gln        | Leu        | Pro         | Tyr<br>350 | Val        | Leu        |
|    | Gly        | Ser        | Ala<br>355   | His        | Gln        | ely        | Суз        | Leu<br>360 | Pro        | Pro        | Phe        | Pro        | Ala<br>365  | Asp        | Val        | Phe        |
| 40 | Met        | Ile<br>370 | Pro          | Gln        | Tyr        | Gly        | Tyr<br>375 | Leu        | Thr        | Leu        | Asn        | ne.<br>380 | Gly         | Ser        | Gln        | Ala        |
| 45 | Val<br>385 | GJY        | Arg          | Ser        | Ser        | Phe<br>390 |            | Суз        | Leu        | Glu        | Tyr<br>395 | Phe        | Pro         | Ser        | Gln        | Met<br>400 |
| 43 | Leu        | Arg        | Thr          | ely        | Asn<br>405 | Asn        | Phe        | Glu        | Phe        | Ser<br>410 | Tyr        | Gln        | Phe         | Glu        | Asp<br>415 | Val        |
| 50 | Pro        | Phe        | His          | Ser<br>420 | Ser        | Tyr        | Ala        |            | Ser<br>425 | Gln        | Ser        | Leu        | Asp         | Arg<br>430 | Leu        | Met        |
|    | Asn        | Pro        | Leu<br>435   | Ile        | Asp        | Gln        |            | Leu<br>440 | Tyr        | Tyr        | Leu        | Ser        | Arg<br>445  | Thr        | Gln        | Ser        |
| 55 |            |            |              |            |            |            |            |            |            |            |            |            |             |            |            |            |

| 5  | Thr        | Gly<br>450 | Gly        | Thr        | Ala        | GЈ         | Thr<br>455 | Gln        | Gln               | Leu        | Leu               | Phe<br>460 | Ser        | Gln         | Ala        | Gly        |
|----|------------|------------|------------|------------|------------|------------|------------|------------|-------------------|------------|-------------------|------------|------------|-------------|------------|------------|
| ,  | Pro<br>465 | Asn        | Asn        | Met        | Ser        | Ala<br>470 | Gln        | Ala        | Lys               | Asn        | Trp<br>475        | Leu        | Pro        | Gly         | Pro        | Cys<br>480 |
| 10 | Tyr        | Arg        | Gln        | Gln        | Arg<br>485 | Val        | Ser        | Thr        | Thr               | Leu<br>490 | Ser               | Gln        | neA        | Asn         | Asn<br>495 | Ser        |
| 45 | леA        | Phe        | Ala        | Trp<br>500 | Thr        | Gly        | Ala        | Thr        | Lys<br>505        | Tyr        | His               | Leu        |            | Gly<br>.510 | Arg        | qеA        |
| 15 | Ser        | Leu        | Val<br>515 | Asn        | Pro        | Gly        | Val        | Ala<br>520 | Met               | Ala        | Thr               | His        | Lys<br>525 | Asp         | Asp        | Glu        |
| 20 | Glu        | Arg<br>530 | Phe        | Phe        | Pro        | ser        | ser<br>535 | Gly        | Val               | Leu        | Met               | Phe<br>540 | Gly        | Lys         | Gl'n       | Gly        |
| 25 | Ala<br>545 | Gly        | Lys        | Asp        | Asn        | Val<br>550 | qeA        | Tyr        | Ser               | Ser        | <b>Val</b><br>555 | Met        | Leu        | Thr         | Ser        | Glu<br>560 |
| 25 | Glu        | Glu        | Ile        | Lys        | Thr<br>565 | Thr        | neA        | Pro        | Val               | Ala<br>570 | Thr               | Glu        | Gln        | Tyr         | Gly<br>575 | Val        |
| 30 | Val        | Ala        | Aśb        | Asn<br>580 | Leu        | Gln        | Glņ        | Gln        | <b>Asn</b><br>585 | Ala        | Ala               | Pro        | Ile        | Val<br>590  | eĵà        | Ala        |
|    | Val        | пеA        | Ser<br>595 | Gln        | Gly        | Ala        | Leu        | Pro<br>600 | Gly               | Met        | Val               | Trp        | Gln<br>605 | Asn         | Arg        | qeA        |
| 35 | Val        | Tyr<br>610 | Leu        | Gln        | Gly        | Pro        | Ile<br>615 | Trp        | Ala               | Lys        |                   | Pro<br>620 | His        | Thr         | Asp        | Gly        |
| 40 | Asn<br>625 | Phe        | His        | Pro        | Ser        | Pro<br>630 | Leu        | Met        | Gly               | Gly        | Phe<br>635        | Gly        | Leu        | Lys         | His        | Pro<br>640 |
|    | Pro        | Pro        | Gln        | Ile        | Leu<br>645 | Ile        | Lys        | Asn        | Thr               | Pro<br>650 | Val               | Pro        | Ala        | qeA         | Pro<br>655 | Pro        |
| 45 | Thr        | Thr        | Phe        | Ser<br>660 | Gln        | Ala        | Lys        | Leu        | Ala<br>665        | Ser        | Phe               | Ile        | Thr        | Gln<br>670  | Tyr        | Ser        |
| 50 | Thr        | Gly        | Gln<br>675 | Val        | Ser        | Val        | Glu        | Ile<br>680 | Glu               | Trp        | Glu               | Leu        | Gln<br>685 | Lys         | Glu        | Asn        |
|    | Ser        | F 30       | Arg        | Trp        | Asn        | Pro        | Glu<br>695 | Ile        | Gln               | Tyr        | Thr               | Ser<br>700 | Asn        | Tyr         | Tyr        | Lys        |

|             |                                          | Se:<br>70: | r Th:      | r Ası      | val        | Asp        | 710        |            | a Val      | eA I       | n Th:      | r Gl:      |            | y Thi      | r Ty       | s Se       | 720        |
|-------------|------------------------------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| 5           |                                          | Pro        | o Ar       | g Pro      | o Ile      | Gly<br>725 |            | : Arg      | ј Туг      | Lei        | 730        |            | z Ası      | 7 Lei      | ג          |            |            |
| 10          | <210> 8<br><211> 7<br><212> F<br><213> 0 | '31<br>PRT | protei     | n of A     | AV sei     | rotype     | , clon     | e 42.4     |            | `          |            |            |            |            |            |            | •          |
| 15          | <400> 8                                  | 88         |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |
|             |                                          | Met<br>1   | Ala        | Ala        | qeA        | G1y<br>5   | Tyr        | Leu        | Pro        | qeA        | Trp<br>10  | Leu        | Glu        | Asp        | Asn        | Leu<br>15  | Ser        |
| 20          |                                          | Glu        | Gly        | Ile        | Arg<br>20  | G) n       | Trp        | Trp        | Asp        | Leu<br>25  | Lya        | Pro        | €ŢĀ        | Ala        | Pro<br>30  | Lys        | Pro        |
| 25          |                                          | Lys        | Ala        | Asn<br>35  | Gln        | Gln        | Lys        | Gln        | Asp<br>40  | Asp        | Gly        | Arg        | GŢĀ        | Leu<br>45  | Val        | Leu        | Pro        |
|             |                                          | Gly        | Tyr<br>50  | Lys        | Tyr        | Leu        | Gly        | Pro<br>55  | Phe        | Asn        | Gly        | Leu        | Asp<br>60  | Lys        | Gly        | Glu        | Pro        |
| <b>30</b> . |                                          | Val<br>65  | Asn        | Glu        | Ala        | Asp        | Ala<br>70  | Ala        | Ala        | Len        | Glu        | His<br>75  | Asp        | Lys        | Ala        | Tyr        | Asp<br>80  |
| 35          |                                          | Lys        | Gln        | Leu        | Glu        | Gln<br>85  | Gly        | Asp        | Asn        | Pro        | Туг<br>90  | Leu        | Lys        | Tyr        | Asn        | His<br>95  | Ala        |
|             |                                          | Asp        | Ala        | Glu        | Phe<br>100 | Gln        | Сlп        | Arg        | Leu        | Gln<br>105 | Glu        | ĄęĄ        | Thr        | Ser        | Phe<br>110 | Gly        | Gly        |
| 10          |                                          | Asn        | Leu        | Gly<br>115 | Arg        | Ala        | Val        | Phe        | Gln<br>120 | Ala        | Lys        | Lys        | Arg        | Val<br>125 | Leu        | Glu        | Pro        |
| 15          |                                          | Leu        | Gly<br>130 | Leu        | Val        | Glu        | G1u        | Gly<br>135 | Ala        | Lys        | Thr        | Ala        | Pro<br>140 | Gly        | Lys        | Lys        | Arg        |
|             |                                          | Pro<br>145 | Ile        | Glu        | Ser        | Pro        | Asp<br>150 | Ser        | Ser        | Thr        | Gly        | Ile<br>155 | G] Ā       | Lys        | Lys        | Gly        | Gln<br>160 |
| 50          | v                                        | Gln        | Pro        | Ala        | Lys        | Lys<br>165 | Lys        | Leu        | Asn        | Pbe        | Gly<br>170 | Gln        | Thr        | Gly        | Asp        | Ser<br>175 | Glu        |
| 5           |                                          | Ser        | Val        | Pro        | Asp<br>180 | Pro        | Gln        | Pro        |            | Gly<br>185 | Glu        | Pro        | Pro        | Ala        | Gly<br>190 | Pro        | Ser        |

|    |   | G1         | y Le       | u Gl<br>19        | y Se<br>S           | r Gl            | y Th       | ır Me        | t Al<br>20 |                         | La G]      | ry Gl      | y G1       | y Al<br>20      |             | O ME       | at Ala       |
|----|---|------------|------------|-------------------|---------------------|-----------------|------------|--------------|------------|-------------------------|------------|------------|------------|-----------------|-------------|------------|--------------|
| 5  |   | As         | p As<br>21 | n As<br>0         | n Gl                | u Gl            | y Al       | .a As<br>21  | p G1<br>5  | y Va                    | .1 G1      | .y As      | n Al<br>22 |                 | r Gl        | y As       | n Trp        |
| 10 |   | Hi<br>22   | s Cy:<br>5 | s As              | p S <sub>i</sub> e. | r Th            | r Tr<br>23 | p Le         | u Gl       | y As                    | p Ar       | g Va<br>23 |            | e Th            | r Th        | r Se       | r Thr<br>240 |
|    |   | Ar         | g Thi      | r Trj             | Ala                 | a Le<br>24      | u Pr       | o Thi        | т Ту:      | r As                    | n As<br>25 | n Hi:<br>O | s Le       | u Ty            | r Ly        | s Gl<br>25 | n Ile<br>5   |
| 15 |   | Sei        | r Sei      | : Glr             | 260                 | Gl <sub>y</sub> | y Ala      | a Thi        | c Ası      | n As <sub>1</sub><br>26 | p As:<br>5 | n His      | 3 Pho      | e Pho           | e Gl;<br>27 |            | r Ser        |
| 20 |   | Thi        | Pro        | 275               | el?                 | у Туг           | Phe        | a Asp        | 280        | e Ası                   | a Ar       | g Phe      | Hi:        | 285             |             | B Phe      | a Ser        |
|    | ` | Ser        | 290        | Asp               | Trp                 | Glr             | Arg        | 7 Leu<br>295 | Ile        | : Asr                   | Asr        | neA i      | 300        | el <sup>7</sup> | / Phe       | Arg        | Pro          |
| 25 |   | Lys<br>305 | Arg        | Leu               | Asn                 | Phe             | Lys<br>310 | Leu          | Phe        | : Asn                   | lle        | Gln<br>315 | Val        | . Lys           | Glu         | Val        | Thr<br>320   |
| 30 |   | Gln        | . Asn      | Glu               | Gly                 | Thr<br>325      | Lys        | Thr          | Ile        | Ala                     | Asn<br>330 | Asn        | Leu        | Thr             | Ser         | Thr<br>335 | Ile          |
|    |   | Gln        | Val        | Phe               | Thr<br>340          | qeA             | Ser        | Glu          | Tyr        | Arg<br>345              | Leu        | Pro        | Tyr        | Val             | Leu<br>350  | Gly        | Ser          |
| 35 |   | Ala        | His        | <b>Gln</b><br>355 | Gly                 | Суз             | Leu        | Pro          | Pro<br>360 | Phe                     | Pro        | Ala        | Asp        | Val<br>365      | Ъџе         | Met        | Ile          |
| 40 |   | Pro        | Gln<br>370 | Tyr               | Gly                 | Tyr             | Leu        | Thr<br>375   | Leu        | Asn                     | Asn        | Gly        | Ser<br>380 | Gln             | Ala         | Val        | Gly          |
|    |   | Arg<br>385 | Ser        | Ser               | Phe                 | туг             | Cys<br>390 | Leu          | Glu        | Tyr                     | Phe        | Pro<br>395 | Ser        | Gln             | Met         | Leu        | Arg<br>400   |
| 45 | · | Thr        | Gly        | neA               | Asn                 | Phe<br>405      | Glu        | Phe          | Ser        | Tyr                     | Gln<br>410 | Phe        | Glu        | Ąsp             | Val         | Pro<br>415 | Phe          |
| 50 |   | His        | Ser        | Sér               | Tyr<br>420          | Ala             | His        | Ser          | Gln        | Ser<br>425              | Leu        | Asp        | Arg        | Leu             | Met<br>430  | Asn        | Pro          |
|    |   | Leu        | Ile .      | Asp<br>435        | Gln                 | Tyr             | Leu        | Tyr          | Tyr<br>440 | Leu                     | Ser        | Arg        | Thr        | Gln<br>445      | Ser         | Thr        | Gly          |
| 55 |   |            |            |                   |                     |                 |            |              |            |                         |            |            |            |                 |             |            |              |

| 5  | G1)        | 7 Th:<br>450 | Ala        | . G1?      | Th:          | c Glr      | 455        |            | ı Let      | ı Phe      | e Ser      | Glr<br>460 |            | a Gly      | y Pro      | ) Asn       |
|----|------------|--------------|------------|------------|--------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|-------------|
|    | Аэг<br>465 | Met          | : șez      | : Ala      | Gln          | Ala<br>470 |            | . Asn      | Trp        | Lev        | 475        |            | Pro        | Cys        | ту         | Arg<br>480  |
| 10 | Gln        | Gln          | Arg        | Val        | . Ser<br>485 |            | Thr        | Leu        | Ser        | Glr<br>490 |            | Asn        | Asn        | Sez        | Asr<br>495 | h Phe       |
| 15 | Ala        | Тгр          | Thr        | G1y<br>500 |              | Thr        | Lys        | Tyr        | His<br>505 |            | Asn        | Gly        | Arg        | Asp<br>510 |            | Leu         |
|    | Val        | Asn          | Pro<br>515 | Gly        | Val          | Ala        | Met        | Ala<br>520 | Thr        | His        | Lys        | qeA        | Asp<br>525 |            | Glu        | Arg         |
| 20 | Pbe        | Phe<br>530   | Pro        | Ser        | Ser          | Gly        | Val<br>535 | Leu        | Met        | Phe        | Gly        | Lys<br>540 |            | Gly        | Ala        | ejà         |
| 25 | Lys<br>545 | Asp          | neA        | Val        | Asp          | Tyr<br>550 | Ser        | Ser        | Val        | Met        | Leu<br>555 | Thr        | Ser        | Glu        | Glu        | Glu<br>560  |
|    | Ile        | Lys          | Thr        | Thr        | Asn<br>565   | Pro        | Val        | Ala        | Thr        | Glu<br>570 | Gln        | Tyr        | Gly        | Val        | Val<br>575 | Ala         |
| 30 | Asp        | Asn          | Leu        | Gln<br>580 | Gln          | Gln        | Asn        | Ala        | Ala<br>585 | Pro        | Ile        | Val        | ΘĴΆ        | Ala<br>590 | Val        | neA         |
| 35 | Ser        | Gln          | Gly<br>595 | Ala        | Leu          | Pro        | СŢĀ        | Met<br>600 | Val        | Trp        | Gln        | aeA        | Arg<br>605 | Asp        | Val        | Tyr         |
|    | Leu        | Gln<br>610   | eĵà        | Pro        | Ile          | Trp        | Ala<br>615 | Lys        | Ile        | Pro        | His        | Thr<br>620 | Ąsp        | СŢУ        | Asn        | Phe         |
| 40 | His<br>625 | Pro          | Ser        | Pro        | Leu          | Met<br>630 | ely        | Gly        | Phe        | Gly        | Leu<br>635 | Lys        | His        | Pro        | Pro        | Pro<br>640  |
| 45 | Gln        | Ile          | Leu        | Ile        | Lys<br>645   | asa        | Thr        | Pro        | Val        | Pro<br>650 | Ala        | Asp        | Pro        | Pro        | Thr<br>655 | Thr         |
|    | Phe        | Ser          | Gln        | Ala<br>660 | Lys          | Pro .      | Ala        | Ser        | Phe<br>665 | Ile        | Thr        | Gln        | Tyr        | Ser<br>670 | Thr        | €1À         |
| 50 | Gln        | Val          | Ser 675    | Val        | Glu          | Ile        |            | Trp<br>680 | Glu        | Leu        | Gln        | Lys        | Glu<br>685 | Asn        | Ser        | <b>L</b> ys |
| 55 | Arg        | Trp<br>690   | Asn        | Pro        | Glu          |            | Gln<br>695 | Tyr        | Thr        | Ser        |            | Tyr<br>700 | Tyr        | Lys        | Ser        | Thr         |

| _  |                                           | Asn<br>705 | Val | qeA         | Phe   | Ala        | Val<br>710 | Asn    | Thr | Glu | Gly        | Thr<br>715 | Tyr | Ser | Glu | Pro | Arg<br>720 |
|----|-------------------------------------------|------------|-----|-------------|-------|------------|------------|--------|-----|-----|------------|------------|-----|-----|-----|-----|------------|
| 5  |                                           | Pro        | Ile | СſУ         | Thr   | Arg<br>725 | Tyr        | Leu    | Thr | Arg | Asn<br>730 | Leu        |     |     |     |     |            |
| 10 | <210><br><211><br><211><br><212><br><213> | 731<br>PRT |     | ,<br>ein of | AAV s | serotyj    | pe, clo    | one 42 | 5A  |     |            |            |     |     |     |     |            |
| 15 | <400>                                     | 89         |     |             |       |            |            |        |     |     |            |            |     |     |     |     |            |
|    |                                           |            |     |             |       |            |            |        |     |     |            |            |     |     |     |     |            |
| 20 |                                           |            |     |             |       |            |            |        |     |     |            |            |     |     |     |     |            |
|    |                                           |            |     |             |       |            |            |        |     |     |            |            |     |     |     |     |            |
| 25 |                                           |            |     | •           |       |            |            |        |     |     |            |            |     |     |     |     |            |
|    |                                           |            |     |             |       |            |            |        |     |     |            |            |     |     |     |     |            |
| 30 |                                           |            |     |             |       |            |            |        |     |     |            |            |     |     |     |     |            |

|           | Met<br>1   | Ala        | Ala        | qeA        | Gly<br>5   | туг               | Leu        | Pro        | qeA o      | Trp<br>10  | Leu        | Glu        | ı Asp          | Asn        | Leu<br>15  | se:        |
|-----------|------------|------------|------------|------------|------------|-------------------|------------|------------|------------|------------|------------|------------|----------------|------------|------------|------------|
| 5         | Glu        | Gly        | lle        | Arg<br>20  | Glu        | Trp               | Trp        | qeA        | Leu<br>25  | Lys        | Pro        | Gly        | Ala            | Pro<br>30  | Lys        | Pro        |
| , 10      | Lys        | Ala        | Asn<br>35  | Gln        | Gln        | Lys               | Gln        | Asp<br>40  | Ąsp        | Gly        | Arg        | Gly        | Leu<br>45      | Val        | Leu        | Pro        |
|           | Gly        | Tyr<br>50  | Lys        | Tyr        | Leu        | Gly               | Pro<br>55  | Phe        | Asn        | Gly        | Leu        | Asp<br>60  | Lys            | Gly        | Glu        | Pro        |
| 15        | Val<br>65  | Asn        | Glu        | Ala        | Asp        | Ala<br>70         | Ala        | Ala        | Leu        | Glu        | His<br>75  | Asp        | Lys            | Ala        | Tyr        | Asp<br>80  |
| 20        | Lys        | Gln        | Leu        | Glu        | Gln<br>85  | Gly               | Asp        | neA        | Pro        | Tyr<br>90  | Leu        | Lys        | Туr            | neA        | His<br>95  | Ala        |
|           | qeA        | Ala        | Glu        | Phe<br>100 | Gln        | Glu               | Arg        | Leu        | Gln<br>105 | Glu        | qeA        | Thr        | Ser            | Phe<br>110 | Gly        | Gly        |
| 25        | Asn        | Leu        | Gly<br>115 | Arg        | Ala        | Val               | Phe        | Arg<br>120 | Ala        | Lys        | Lys        | Arg        | <b>Val</b> 125 | Leu        | Glu        | Pro        |
| 30        | Leu        | Gly<br>130 | Leu        | Val        | Glu        | Glu               | Gly<br>135 | Ala        | Lys        | Thr        | Ala        | Pro<br>140 | GJY            | Lys        | Lys        | Arg        |
|           | Pro<br>145 | Ile        | Glu        | Ser        | Pro        | <b>Asp</b><br>150 | Ser        | Ser        | Thr        | Gly        | Ile<br>155 | Gly        | Lys            | Lys        | elà        | Gln<br>160 |
| <b>35</b> | Gln        | Pro        | Ala        | Lys        | Lys<br>165 | Lys               | Leu        | Asn        | Phe        | Gly<br>170 | Gln        | Thr        | Gly            | Asp        | Ser<br>175 | Glu        |
| 40        | Ser        | Val        | Pro        | Asp<br>180 | Pro        | Gln               | Pro        | Leu        | Gly<br>185 | Glu        | Pro        | Pro        | Ala            | Ala<br>190 | Pro        | Ser        |
|           | Gly        | Leu        | Gly<br>195 | Ser        | Gly        | Thr               | Met        | Ala<br>200 | Ala        | Gly        | Gly        | Gly        | Ala<br>205     | Pro        | Met        | Ala        |
|           |            |            |            |            |            |                   |            |            |            |            |            |            |                |            |            |            |

| 5  |   | Asp        | 210        |            | Glu        | . Gly      | , YJa      | Asp<br>215 |            | Val        | . Gly      | Asn        | Ala<br>220 |            | Gly               | ' Asr      | Trp        |
|----|---|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|-------------------|------------|------------|
| 10 |   | His<br>225 |            | Asp        | Ser        | Thr        | Trp<br>230 |            | Gly        | qeA        | Arg        | Val<br>235 |            | Thr        | Thr               | Ser        | Thr<br>240 |
| 10 | • | Arg        | Thr        | Trp        | Ala        | Leu<br>245 |            | Ťhr        | Tyr        | neA        | Asn<br>250 |            | Leu        | Tyr        | Lys               | Gln<br>255 | Ile        |
| 15 |   | ser        | Ser        | Gln        | 3er<br>260 | еђу        | Ala        | Thr        | Asn        | Asp<br>265 |            | His        | Phe        | Phe        | Gly<br>270        |            | Ser        |
|    |   | Thr        | Pro        | Trp<br>275 | Gly        | Tyr        | Phe        | Asp        | Phe<br>280 | Asn        | Arg        | Phe        | His        | Cys<br>285 |                   | Phe        | Ser        |
| 20 | • | Pro        | Arg<br>290 | Asp        | Trp        | Gln        | Arg        | Leu<br>295 | Ile        | Asn        | Asn        | neA        | Arg<br>300 | ĠĴŷ        | Phe               | Arg        | Pro        |
| 25 |   | Arg<br>305 |            | Leu        | Arg        | Phe        | Lys<br>310 | Leu        | Phe        | Asn        | Ile        | Gln<br>315 | Val        | Lys        | Glu               | Val        | Thr<br>320 |
|    | · | Thr        | Asn        | Ąsp        | e1À        | Val<br>325 | Thr        | Thr        | Ile        | Ala        | Asn<br>330 | Asn        | Leu        | Thr        | Ser               | Thr<br>335 |            |
| 30 |   | Gln        | Val        | Phe        | ser<br>340 | Asp        | Ser        | Glu        | Tyr        | Gln<br>345 | Leu        | Pro        | Туг        | Val        | <i>Leu</i><br>350 | GĮУ        | Ser        |
| 35 |   | Ala        | His        | Gln<br>355 | Gly        | Cys        | Leu        | Pro        | Pro<br>360 | Phe        | Pro        | Ala        | qeA        | Val<br>365 | Phe               | Met        | Ile        |
|    |   | Pro        | Gln<br>370 | Tyr        | Gly        | Tyr        | Leu        | Thr<br>375 | Leu        | Asn        | Asn        | Gly        | Ser<br>380 | Gln        | Ser               | Val        | Gly        |
| 40 |   | Arg<br>385 | Ser        | Ser        | Phe        | Tyr        | Суз<br>390 | Leu        | Glu        | Tyr        | Phe        | Pro<br>395 | Ser        | Gla        | Met               | Leu        | Arg<br>400 |
| 45 |   | Thr        | Gly        | Asn        | Asn        | Phe<br>405 | Glu        | Phe        | Ser        |            | Gln<br>410 | Phe        | Glu        | qeA        | Val               | Pro<br>415 | Phe        |
|    |   | His        | Ser        | Ser        | Tyr<br>420 | Ala        | His        | Ser        |            | Ser<br>425 | Leu        | Asp        | Arg        | Leu        | Met<br>430        | neA        | Pro        |
| 50 |   | Leu        | Ile        | Asp<br>435 | Gln        | Tyr        | Leu        |            | Tyr<br>440 | Leu        | Ser        | Arg        | Thr        | Gln<br>445 | Ser               | Thr        | Gly        |
| 55 |   | Gly        | Thr<br>450 | Ala        | GŢÀ        | Thr        |            | Gln<br>455 | Leu        | Leu        | Phe        |            | Gln<br>460 | Ala        | Gly               | Pro        | Asn        |

|           | 465        |            | Ser        | ATA        | GIN        | 470        |            | ASII       | 119        | neu        | 475        |            | 210         | 0,5        | - y-       | 480        |
|-----------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|-------------|------------|------------|------------|
| 5         | Gln        | Gln        | Arg        | Val        | Ser<br>485 |            | Thr        | Leu        | Ser        | Gln<br>490 |            | Asn        | neA .       | Ser        | Asn<br>495 |            |
| 10        | Ala        | Trp        | Thr        | Gly<br>500 |            | Thr        | Lys        | Tyr        | His<br>505 |            | Asn        | Gly        | Arg         | Asp<br>510 | Ser        | Leu        |
| _         | Val        | Asn        | Pro<br>515 | _          | Val        | Ala        | Met        | Ala<br>520 | Thr        | His        | Lys        | Asp        | Asp<br>525  | Glu        | Glu        | Arg        |
| 15        |            | Phe<br>530 |            | Ser        | Ser        | Gly        | Val<br>535 | Leu        | Met        | Phe        | Gly        | Lys<br>540 | Gln         | ejà        | Ala        | Gly        |
| 20        | Lys<br>545 |            | Asn        | Val        | qeK        | Tyr<br>550 | Ser        | Ser        | Val        | Met        | Leu<br>555 | Thr        | Ser         | Glu        | Glu        | Glu<br>560 |
| 25        | Ile        | Lys        | Thr        | Thr        | Asn<br>565 | Pro        | Val        | Ala        | Thr        | Glu<br>570 | Gln        | Tyr        | Gly         | Val        | Val<br>575 | Ala        |
|           | Asp        | Asn        | Leu        | Gln<br>580 | Gln        | Gln        | Asn        | Ala        | Ala<br>585 | Pro        | Ile        | Val        | Gly         | Ala<br>590 | Val        | Asn        |
| 30        | Ser        | Gln        | Gly<br>595 | Ala        | Leu        | Pro        | GŢĀ        | Met<br>600 | Ala        | Trp        | Gln        | Asn        | Arg<br>605  | qeK        | Val        | Tyr        |
| <i>35</i> | Leu        | 610        | Gly        | Pro        | Ile        | Trp        | Ala<br>615 | Lys        | Ile        | Pro        | His        | Thr<br>620 | <b>A</b> 5p | Gly        | Asn        | Phe        |
|           | His<br>625 | Pro        | Ser        | Pro        | Leu        | Met<br>630 | Gly        | Gly        | Phe        | Gly        | Leu<br>635 | Lys        | His         | Pro        | Pro        | Pro<br>640 |
| 40        | Gln        | Ile        | Leu        |            | Lys<br>645 | Asn<br>    | Thr        | Pro        | Val        | Pro<br>650 | Ala        | qeA        | Pro         | Pro        | Thr<br>655 | Thr        |
| 45        | Phe        | Ser        |            | Ala<br>660 |            | Leu        |            | Ser        |            |            | Thr        |            | -           | Ser<br>670 | Thr        | Gly        |
|           | Gln        | Val        | Ser<br>675 | Val        | Glu        | Ile        | Glu        | Trp<br>680 | Glu        | Leu        | Gln        | Lys        | Glu<br>685  | Asn        | Ser        | Lys        |
| 50        | Arg        | Trp<br>690 | Asn        | Pro        | Glu        | Ile        | Gln<br>695 | Tyr        | Thr        | Ser        | Asn        | туr<br>700 | Tyr         | Lys        | Ser        | Thr        |
| 55        | Asn<br>705 | Val        | Asp        | Phe        | Ala        | Val<br>710 | Asn        | Thr        | Glu        | Gly        | Thr<br>715 | Tyr        | Ser         | Glu        | Pro        | Arg<br>720 |

# Pro Ile Gly Thr Arg Tyr Leu Thr Arg Asn Leu 725 730

| 5         |                  |          |        |       |             |             |          |            |             |      |           |             |     |            |      |      |      |
|-----------|------------------|----------|--------|-------|-------------|-------------|----------|------------|-------------|------|-----------|-------------|-----|------------|------|------|------|
|           | <210> 90         |          |        |       |             |             |          |            |             |      |           |             |     |            |      |      |      |
|           |                  |          |        |       |             |             |          |            |             |      |           |             |     |            |      |      |      |
|           | <211> 73         | 3        |        |       |             |             |          |            |             |      |           |             |     |            |      |      |      |
|           | <212> PF         | 27       |        |       |             |             |          |            |             |      |           |             |     |            |      |      |      |
|           |                  |          |        |       |             |             |          |            | _           |      |           |             |     |            |      |      |      |
|           | <213> ca         | psia p   | rotein | OT AA | V ser       | otype,      | cione    | 42.1       | 3           |      |           |             |     |            |      |      |      |
| 10        |                  |          |        |       |             |             |          |            |             |      |           |             |     |            |      |      |      |
|           | <400> 90         |          |        |       |             |             |          |            |             |      |           |             |     |            |      |      |      |
|           | <b>\400</b> 2 90 |          |        |       |             |             |          |            |             |      |           |             |     |            |      |      |      |
|           |                  |          |        |       |             |             |          |            |             |      |           |             |     |            |      |      |      |
|           |                  |          |        |       |             |             |          |            |             |      |           |             |     |            |      |      |      |
|           |                  | Met      | Ala    | Ala   | asa         | Glv         | Tvr      | Leu        | Pro         | qe.A | TID       | Leu         | Glu | <b>GEA</b> | Asn  | Leu  | Ser  |
|           |                  | 1        |        |       |             | 5           | - 4 -    |            |             |      | 10        |             |     | •          |      | 15   |      |
| 15        |                  | -        |        |       |             | •           |          |            |             |      |           |             |     |            |      |      |      |
|           |                  |          |        |       |             |             |          |            |             |      |           |             |     |            |      |      |      |
|           |                  |          |        |       |             |             |          |            |             |      |           |             |     | _          |      |      |      |
|           | •                | Glu      | Gly    | Ile   | Arg         | Glu         | Trp      | Ţŗp        | qaA         | Leu  | Arg       | Pro         | Gly | Ala        | Pro  | Lys  | Pro  |
|           |                  |          |        |       | 20          |             |          |            |             | 25   |           |             |     |            | 30   |      |      |
|           |                  |          |        |       |             |             |          |            |             |      |           |             |     |            |      |      |      |
|           |                  |          |        |       |             |             |          |            |             |      |           |             |     |            |      |      |      |
| 20        |                  | <b>7</b> |        | •     | <b>~</b> 3_ | <b>61</b> - | <b>7</b> | <b>-1-</b> | <b>&gt;</b> |      | <b>~1</b> | 7           | c1  | T          | 32-3 | Ŧ    |      |
|           |                  | гАа      | ATA    |       | GTH         | GIN         | гуз      | GIII       | _           | ASP  | GIY       | Arg         | GTĀ |            | VAI  | Leu  | PIO  |
|           |                  |          |        | 35    |             |             |          |            | 40          |      |           |             |     | 45         |      |      |      |
|           |                  |          |        |       |             |             |          |            |             |      |           |             |     |            |      |      |      |
|           |                  |          |        |       |             |             |          |            |             |      |           |             |     |            |      |      |      |
|           |                  | Glv      | TVY    | T.VS  | TVr         | Len         | 61 v     | Pro        | Phe         | Agn  | Glv       | Leu         | Asn | T.VS       | GIV  | Glu  | Pro  |
|           |                  |          | 50     | -15   | - 1 -       | 204         |          | 55         |             |      | 1         |             | 60  |            | 1    |      |      |
| 25        | ,                |          | 30     |       |             |             |          | J J        |             |      |           |             | 00  |            |      |      |      |
|           |                  |          |        |       |             |             |          |            |             |      |           |             |     |            |      |      |      |
|           |                  |          |        |       |             |             |          |            |             |      |           |             |     |            |      |      |      |
|           |                  | Val      | Asn    | Glu   | Ala         | Asp         | Ala      | Ala        | Ala         | Leu  | Glu       | His         | Asp | Lys        | Ala  | Tyr  | Asp  |
|           |                  | 65       |        |       |             | -           | 70       |            |             |      |           | 75          | -   | _          |      | _    | 80   |
|           |                  |          |        |       |             |             | _        |            |             |      |           |             |     |            |      |      | -    |
|           |                  |          |        |       |             |             |          |            |             |      |           |             |     |            |      |      |      |
| 30        |                  | _        |        | _     |             |             |          | _          | _           | _    | _         | _           | _   | _          | _    |      |      |
| ••        |                  | Lys      | Gin    | Leu   | Glu         |             | GTA      | Asp        | Asn         | Pro  |           | Leu         | Lys | Tyr        | ara  | His  | Ala  |
|           |                  |          |        |       |             | 85          |          |            |             |      | 90        |             |     |            |      | 95   |      |
|           |                  |          |        |       |             |             |          |            |             |      |           |             |     |            |      |      |      |
|           |                  | Asp      | Ala    | Glu   | Phe         | Gln         | Glu      | Ara        | Leu         | Gln  | Glu       | asa         | Thr | Ser        | Phe  | Gly  | Glv  |
|           |                  |          |        |       | 100         |             |          | 5          |             | 105  |           |             |     |            | 110  | 2    | 3    |
|           |                  | •        |        |       | 100         |             |          |            |             | 103  |           |             |     |            | 110  |      |      |
| <i>35</i> |                  |          |        |       |             |             |          |            |             |      |           |             |     |            |      |      |      |
|           |                  |          |        | _     |             | _           | _        | _          |             |      |           |             |     |            |      |      |      |
|           |                  | Asn      | Leu    | Gly   | Arg         | Ala         | Val      | Phe        | ${	t Gln}$  | Ala  | Lys       | Lys         | Arg | Val        | Leu  | Glu  | Pro  |
|           |                  |          |        | 115   |             |             |          | •          | 120         |      |           |             |     | 125        |      |      |      |
|           |                  |          |        |       |             |             |          |            |             |      |           |             |     |            |      |      |      |
|           |                  |          |        |       |             |             |          |            |             |      |           |             |     |            |      |      |      |
|           |                  | 7        | c)     | T     | 3/- 3       | ~1··        | ~ 3 ···  | C 3        | 77-         | T    | m >       | <b>31</b> - | D   | ~1         | 7    | T    | 3    |
| 40        |                  | rea      |        | rea   | VAI         | GIU         | GIU      | _          | MIG         | гåз  | THE       | ΑΙα         |     | GIA        | гĀя  | ГЛа  | Arg  |
|           |                  |          | 130    |       |             |             |          | 135        |             |      |           |             | 140 |            |      |      |      |
|           |                  |          |        |       |             |             |          |            |             |      |           |             |     |            |      |      |      |
|           |                  |          |        |       |             |             |          |            |             |      |           |             |     |            |      |      |      |
|           |                  | Pro      | Tle    | G311  | Ser         | Pro         | Agn      | Ser        | Ser         | ጥክ ታ | Glv       | Tle         | Glv | T.vg       | T.V9 | Gly  | G) n |
|           |                  | 145      |        | 924   |             |             | 150      |            |             |      | 013       | 155         |     | 2,5        | 475  | O-13 |      |
|           |                  | 143      |        |       |             |             | 130      |            |             |      |           | 133         |     |            |      |      | 160  |
| 45        |                  |          |        |       |             |             |          |            |             |      |           |             |     |            |      |      |      |
| 45        |                  |          |        |       |             |             |          |            |             |      |           |             |     |            |      |      |      |
|           |                  | Gln      | Pro    | Ala   | Lvs         | Lvs         | Ara      | Leu        | Asn         | Phe  | Glv       | Gln         | Thr | Glv        | σε.Α | Ser  | Glu  |
|           |                  |          |        |       | -3-         | 165         |          |            | •           |      | 170       |             |     | 2          |      | 175  |      |
|           |                  |          |        |       |             | 100         |          |            |             |      | 1.0       |             |     |            |      | 1,0  |      |
|           |                  |          |        |       |             |             |          |            |             |      |           |             |     |            |      |      |      |
|           |                  |          |        |       |             |             |          |            |             |      |           |             |     |            |      |      |      |
|           |                  | Ser      | Val    | Pro   | Asp         | Pro         | Gln      | Pro        | Ile         | Gly  | Glu       | Pro         | Pro | Ala        | Gly  | Pro  | Ser  |
| 50        |                  |          |        |       | 180         |             |          |            |             | 185  |           |             |     |            | 190  |      |      |
|           |                  |          |        |       |             |             |          |            |             |      |           |             | •   |            |      |      |      |
|           |                  |          |        |       |             |             |          |            |             |      |           |             |     |            |      |      |      |
|           |                  |          |        |       |             | •           |          |            | _           | _    |           |             |     |            | _    |      |      |
|           |                  | Gly      | Leu    | Gly   | Ser         | Gly         | Thr      | Met        | Ala         | Ala  | Gly       | Gly         | Gly | Ala        | Pro  | Met  | Ala  |
|           | •                | -        |        | 195   |             |             |          |            | 200         |      |           |             |     | 205        |      |      |      |
|           |                  |          |        | -     |             |             |          |            |             |      |           |             |     |            |      |      |      |
| 55        |                  |          |        |       |             |             |          |            |             |      |           |             |     |            |      |      |      |
|           |                  |          |        |       |             |             |          | _          |             |      |           | _           |     |            |      | _    | _    |
|           |                  | qeA      |        | Asn   | ĊΤ <i>Π</i> | erA         | ATE      |            | erA         | val  | GTÀ       | ser         |     | ser        | GTÀ  | Asn  | TTP  |
|           |                  |          | 210    |       |             |             |          | 215        |             |      |           |             | 220 |            |      |      |      |
|           |                  |          |        |       |             |             |          |            |             |      |           |             |     |            |      |      |      |

|           | Hi:<br>225 | s Cys      | e A s      | p Se         | r Thi      | 230        |            | 1 GJ       | / As       | p Arg        | 7 Va:<br>23: |            | e Thi        | r Thi      | r Se        | Thr<br>240 |
|-----------|------------|------------|------------|--------------|------------|------------|------------|------------|------------|--------------|--------------|------------|--------------|------------|-------------|------------|
| 5         | Arç        | Th:        | тер        | p Ala        | 245        | Pro        | Th         | туг        | : Ası      | n Asr<br>250 |              | s Lei      | ı Ty         | r Ly:      | 6 Glr<br>25 |            |
| 10        | Ser        | . Ašn      | Gly        | 7 Thi<br>260 | Ser        | : Gly      | . eJ?      | / Ser      | Th:        |              | a Asp        | Ası        | ı Tbı        | 270        |             | Gly        |
| 15        | Tyr        | : Ser      | Th: 275    | Pro          | Trp        | Gly        | Туг        | Phe<br>280 |            | Phe          | : Asr        | Arg        | y Phe<br>285 |            | Cys         | His        |
| 15        | Phe        | Ser<br>290 | Pro        | Arg          | qeA        | Trp        | Gln<br>295 |            | Leu        | : Ile        | . Asr        | Asr<br>300 |              | Trp        | Gly         | Phe        |
| 20        | Arg<br>305 | Pro        | Lys        | Arg          | Leu        | Asn<br>310 | Phe        | Lys        | Leu        | Phe          | Asn<br>315   |            | Gln          | Val        | Lys         | Glu<br>320 |
| . •       | <br>Val    | Thr        | Gln        | Asn          | Glu<br>325 | Gly        | Thr        | Lys        | Thr        | Ile<br>330   | Ala          | Asn        | neA .        | Leu        | Thr<br>335  | Ser        |
| 25        | Thr        | Ile        | Gln        | Val<br>340   | Phe        | Thr        | qeA        | Ser        | Glu<br>345 |              | Gln          | Leu        | Pro          | Tyr<br>350 |             | Leu        |
| 30        | Gly        | Ser        | Ala<br>355 | His          | Gln        | Gly        | Cys        | Leu<br>360 | Pro        | Pro          | Phe          | Pro        | Ala<br>365   | Asp        | Val         | Phe        |
|           | Met        | Ile<br>370 | Pro        | Gln          | Tyr        | Gly        | Туг<br>375 | Leu        | Thr        | Leu          | Asn          | Asn<br>380 | Gly          | Ser        | Gln         | Ala        |
| <i>35</i> | Val<br>385 | Сĵ         | Arg        | Ser          | Ser        | Phe<br>390 | Tyr        | Суз        | Leu        | Glu          | Tyr<br>395   | Phe        | Pro          | Ser        | Gln         | Met<br>400 |
| 40        | Leu        | Arg        | Thr        | Gly          | Asn<br>405 | Asn        | Phe        | eJп        | Phe        | Ser<br>410   | Tyr          | Gln        | Phe          | Glu        | Asp<br>415  | Val        |
|           | Pro        | Phe        | His        | Ser<br>420   | Ser        | Tyr        | Ala        | His        | Ser<br>425 | Gln          | Ser          | Leu        | qeA          | Arg<br>430 | Leu         | Met        |
| 45        | Asn        | Pro        | Leu<br>435 | Ile          | Asp        | Gln        | Tyr        | Leu<br>440 | Tyr        | Tyr          | Leu          | Ser        | Arg<br>445   | Thr        | Gln         | Ser        |
| 50        | Thr        | Gly<br>450 | Gly        | Thr          | Ala        | Gly        | Thr<br>455 | Gln        | Gln        | Leu          | Leu          | Phe<br>460 | Ser          | Gln        | Ala         | Gly        |
|           | Pro<br>465 | Asn        | Asn        | Met          | Ser        | Ala<br>470 | Gln        | Ala        | Lys        | Asn          | Trp<br>475   | Leu        | Pro          | Gly        | Pro         | Cys<br>480 |
| 55        |            |            |            |              |            |            |            |            |            |              |              |            |              |            |             |            |

|           |   |    | Tyr        | Arg        | Gln        | Gln        | Arg<br>485 |            | . Ser      | Thr        | Thr        | Val<br>490 |            | Glr        | n Asn      | neA        | Asn<br>495 |             |
|-----------|---|----|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|-------------|
| 5         |   |    | Asn        | Phe        | Ala        | Trp<br>500 |            | вlу        | Ala        | Thr        | Lys<br>505 |            | His        | Leu        | Asn        | Gly<br>510 |            | Asp         |
| 10        |   | `  | Ser        | Leu        | Val<br>515 | Asn        | Pro        | Gly        | Val        | Ala<br>520 |            | Ala        | Thr        | His        | Lys<br>525 |            | Asp        | Glu         |
| 15        |   |    | Glu        | Arg<br>530 |            | Phe        | Pro        | ser        | Ser<br>535 |            | Val        | Leu        | Met        | Phe<br>540 |            | Lys        | Gln        | ej Â        |
|           |   |    | Ala<br>545 |            | Lys        | Asp        | Asn        | Val<br>550 | Asp        | Tyr        | Ser        | Ser        | Val<br>555 |            | Leu        | Thr        | Ser        | Glu<br>560  |
| 20        | - |    | Glu        | Glu        | Ile        | Lys        | Thr<br>565 | Thr        | Asn        | Pro        | Val        | Ala<br>570 | Thr        | Glu        | Gln        | Tyr        | Gly<br>575 | Val         |
| 25        |   |    | Val        | Ala        | Asp        | Asn<br>580 | Leu        | Gln        | Gln        | Gln        | Asn<br>585 | Ala        | Ala        | Pro        | Ile        | Val<br>590 | Gly        | Ala         |
| 25        |   |    | Val        | Asn        | Ser<br>595 | Gln        | Gly        | Ala        | Leu        | Pro<br>600 | Gly        | Met        | Val        | Trp        | Gln<br>605 | Asn        | Arg        | Asp         |
| 30        |   |    | Val        | Tyr<br>610 | Leu        | Gln        | Gly        | Pro        | Ile<br>615 | Trp        | Ala        | Lys        | Ile        | Pro<br>620 | His        | Thr        | Asp        | G1 <b>À</b> |
| 25        |   |    | Asn<br>625 | Phe        | His        | Pro        | Ser        | Pro<br>630 | Leu        | Met        | Gly        | Gly        | Phe<br>635 | Gly        | Leu        | Lys        | His        | Pro<br>640  |
| 35        |   |    | Pro        | Pro        | Gln        | Ile        | Leu<br>645 | Ile        | Lys        | Asn        | Thr        | Pro<br>650 | Val        | Pro        | Ala        | Ąsp        | Pro<br>655 | Pro         |
| 40        |   |    | Thr        | Thr        | Phe        | Ser<br>660 | Gln        | Ala        | Lys        | Leu        | Ala<br>665 | Ser        | Phe        | Ile        | Thr        | Gln<br>670 | Tyr        | Ser         |
|           |   |    | Thr        | Gly        | Gln<br>675 | Val        | Ser        | Val        | Glu        | Ile<br>680 | Glu        | Trp        | Glu        | Leu        | Gln<br>685 | Lys        | e1'n       | neA         |
| <b>15</b> |   |    | Ser        | Lys<br>690 | Arg        | Trp        | Asn        | Pro        | Glu<br>695 | Ile        | Gln        | Tyr        | Thr        | Ser<br>700 | Asn        | Tyr        | Tyr        | Lys         |
| 50        |   |    | Ser<br>705 | Thr        | Asn        | Val        |            | Phe<br>710 | Ala        | Val        | Asn        |            | Glu<br>715 | Gly        | Thr        | Tyr        |            | Glu<br>720  |
|           |   | ٠. | Pro        | Arg        | Pro        | Ile        | Gly<br>725 | Thr        | Arg        | Tyr        |            | Thr<br>730 | Arg        | Asn        | Leu        |            |            |             |

<210> 91

<211> 738 <212> PRT

<213> capsid protein of AAV serotype, clone 42.5B

| 5  | <400> 91 |            |            |            |            |              |            |              |            |            |             |            |            |             |            |            |                   |
|----|----------|------------|------------|------------|------------|--------------|------------|--------------|------------|------------|-------------|------------|------------|-------------|------------|------------|-------------------|
|    |          | Met<br>1   | : Ala      | a Ale      | eA e       | , Gly        | у Ту       | r Lei        | ı Pr       | o As       | p Trj<br>10 | p Le       | u Gl       | ı Ası       | p As:      | n Le       | u Ser             |
| 10 |          | Glu        | Gly        | y Ile      | 20         | g Glı        | ı Tr       | p Trp        | eA c       | 25         | u Ly:       | s Pro      | Gly        | / Ala       | 30         | D Ly       | s Pro             |
|    |          | Lys        | Ala        | Asn<br>35  | Glr        | Gln          | Ly:        | s Gln        | 40         | ) Ası      | e ely       | / Arq      | , el       | / Let<br>45 | val        | L Le       | u Pro             |
| 15 |          | Gly        | Ту:<br>50  | : Lys      | Tyr        | Leu          | Gly        | Pro<br>55    | Phe        | e Ası      | r ell       | / Let      | Asp<br>60  | Lys         | Gly        | / Glu      | ı Pro             |
|    |          | Val<br>65  | neA        | Glu        | Ala        | qeA .        | Ala<br>70  | Ala          | Ala        | Lev        | ı Glu       | His<br>75  | Asp        | Lys         | Ala        | туз        | q <b>z</b> A 7    |
| 20 |          | Lys        | Gln        | Leu        | Glu        | Gln<br>85    | Gly        | Asp          | Asn        | Pro        | 90          | Leu        | Lys        | Tyr         | Asn        | His<br>95  | Ala               |
| 25 |          | Asp        | Ala        | Glu        | Phe<br>100 | Ġļņ          | Glu        | Arg          | Leu        | Gln<br>105 |             | Asp        | Thr        | Ser         | Phe<br>110 |            | Gly               |
|    |          | neA        | Leu        | Gly<br>115 | Arg        | Ala          | Val        | Phe          | Gln<br>120 | Ala        | Lys         | Lys        | Arg        | Val<br>125  | Leu        | Glu        | Pro               |
| 30 |          | Leu        | Gly<br>130 | Leu        | Val        | Glu          | Glu        | Gly<br>135   | Ala        | Lys        | Thr         | Ala        | Pro<br>140 | Gly         | Lys        | Lys        | Arg               |
| 35 |          | Pro<br>145 | Val        | Glu        | Pro        | ser          | Pro<br>150 | Gln          | Arg        | Ser        | Pro         | Asp<br>155 | Ser        | Ser         | Thr        | Gly        | Ile<br>160        |
|    | . (      | Gly        | Lys        | Thr        | Gly        | Gln<br>165   | Gln        | Pro          | Ala        | Lys        | Lys<br>170  | Arg        | Leu        | Asn         | Phe        | Gly<br>175 | Gln               |
| 40 | 7        | Chr        | Gly        | qeA        | Ser<br>180 | Glu          | Ser        | Val          | Pro        | Asp<br>185 | Pro         | Gln        | Pro        | Ile         | Gly<br>190 | Glu        | Pro               |
| 45 | I        | ?ro .      | Ala        | Gly<br>195 | Pro        | Ser          | Gly        | Leu          | Gly<br>200 | Ser        | ely         | Thr        |            | Ala<br>205  | Ala        | Сlу        | Gly               |
|    | G        | ly :       | Ala<br>210 | Pro :      | Met .      | Ala .        | Asp        | Asn .<br>215 | Asn        | Glu        | eĵà         | Ala        | Asp<br>220 | Gly         | Val        | Gly        | Ser               |
| 50 | 9<br>2   | er :       | Ser        | Gly :      | neA        | Trp :        | His<br>230 | Cys :        | qeA        | Ser        |             | Trp<br>235 | Leu        | Gly         | qeA        | Arg        | <b>Val</b><br>240 |
| 55 | I        | le :       | Chr '      | Thr :      | ser :      | Thr 1<br>245 | Arg        | Thr '        | Trp .      |            | Leu<br>250  | Pro        | Thr '      | Tyr .       |            | Asn<br>255 | His               |

|    | Le         | и ту         | r Ly:      | 260        | n Il<br>O  | e Se         | eA r       | n Gl         | y Th:<br>26: |            | r Gl       | y Gl       | y Se.       | 271        |            | qeA n      |
|----|------------|--------------|------------|------------|------------|--------------|------------|--------------|--------------|------------|------------|------------|-------------|------------|------------|------------|
| 5  | еA         | n Thi        | r Ty:      | r Phe      | e Gl       | у Ту         | r Se       | r Thi<br>280 |              | Tr         | Gly        | Y Ty       | r Phe<br>28 |            | Phe        | neA e      |
| 10 | Ar         | g Phe<br>290 | e His      | з Суз      | Hi:        | s Phe        | 295        |              | Ar           | g Asp      | Ţrp        | 30         |             | j Lei      | ı Ile      | : Asn      |
| ٠  | As:        | n Asr<br>5   | Trp        | Gly        | / Phe      | a Arg<br>310 |            | Lys          | Arg          | Leu        | Asr<br>315 |            | e Lys       | Lev        | Phe        | Asn<br>320 |
| 15 | IĻ         | e Glr        | Val        | Lys        | G1.<br>325 | ı Val        | Thr        | Gln          | . Asn        | 330        | ely        | Thi        | L Lys       | Thr        | Ile<br>335 |            |
| 20 | Ası        | Asn          | Leu        | Thr<br>340 | Ser        | Thr          | Ile        | Gln          | Val<br>345   |            | Thr        | Asp        | ) Ser       | Glu<br>350 |            | Gln        |
|    | Lev        | Pro          | Tyr<br>355 | Val        | Leu        | . Gly        | Ser        | Ala<br>360   |              | Gln        | еĵу        | Суз        | Leu<br>365  |            | Pro        | Phe        |
| 25 |            | Ala<br>370   |            | Val        | Phe        | Met          | Ile<br>375 | Pro          | Gln          | Tyr        | ely        | Tyr<br>380 |             | Thr        | Leu        | Asn        |
| 30 | Asn<br>385 | Gly          | Ser        | Gln        | Ala        | Val<br>390   | Gly        | Arg          | Ser          | Ser        | Phe<br>395 | Tyr        | Cys         | Leu        | Glu        | Tyr<br>400 |
|    | Phe        | Pro          | Ser        | Gln        | Met<br>405 | Leu          | Arg        | Thr          | Gly          | Asn<br>410 | Asn        | Phe        | Glu         | Phe        | Ser<br>415 | Tyr        |
| 35 | Gln        | Phe          | Glu        | Asp<br>420 | Val        | Pro          | Phe        | His          | Ser<br>425   | Ser        | Tyr        | Ala        | His         | Ser<br>430 | Gln        | Ser        |
| 40 | Leu        | Asp          | Arg<br>435 | Leu        | Met        | Asn          | Pro        | Leu<br>440   | Ile          | qeA        | Gln        | Tyr        | Leu<br>445  | Tyr        | Tyr        | Leu        |
|    | Ser        | Arg<br>450   | Thr        | Gln        | Ser        | Thr          | Gly<br>455 | Gly          | Thr          | Ala        | Gly        | Thr<br>460 | Gln         | Gln        | Leu        | Leu        |
| 45 | Phe<br>465 | Ser          | Gln        | Ala        | Gly        | Pro<br>470   | neA        | Asn          | Met          | Ser        | Ala<br>475 | Gln        | Ala         | Lys        | Asn        | Trp<br>480 |
| 50 | Leu        | Pro          | Gly        | Pro        | Cys<br>485 | Tyr          | Arg        | Gln          | Gln          | Arg<br>490 | Val        | Ser        | Thr         | Thr        | Leu<br>495 | Ser        |
|    | Gln        | Asn          | Asn        | Asn<br>500 | Ser        | Asn          | Phe        |              | Trp<br>505   | Thr        | Gly        | Ala        | Thr         | Lys<br>510 | Tyr        | His        |

|            |                                 | ŗe         | u As       | 515         |                 | g Asp      | Se.          | r Le         | 1 Va:<br>520 |            | n Pro      | o Gly      | y Va:      | 1 Ala<br>52 |            | t Al       | a Thr      |
|------------|---------------------------------|------------|------------|-------------|-----------------|------------|--------------|--------------|--------------|------------|------------|------------|------------|-------------|------------|------------|------------|
| 5          |                                 | Hi         | 530        | a Asp       | As <sub>p</sub> | Gl.        | Gl:          | u Arg<br>535 |              | e Phe      | Pro        | Sea        | 540        |             | y Val      | l Lei      | ı Met      |
| 10         |                                 | Phe<br>545 | e Gly      | , Lya       | Gln             | Gly        | 7 Ala<br>550 | a Gly        | ' Lys        | Asp        | Asn        | Val<br>555 |            | ту:         | : Ser      | Se:        | Val<br>560 |
|            |                                 | Met        | Lev        | Thr         | Ser             | Glu<br>565 | Gli          | ı Glu        | Ile          | Lys        | Thr<br>570 | Thr        | Asn        | Pro         | Val        | Ala<br>575 | Thr        |
| 15         |                                 | Glu        | Gln        | Tyr         | Gly<br>580      | Val        | Va]          | . Ala        | Asp          | Asn<br>585 | Leu        | Gln        | Gln        | Gln         | Asn<br>590 |            | Ala        |
| 20         |                                 | Pro        | Ile        | Val<br>595  | Gly             | Ala        | Val          | Asn          | Ser<br>600   | Gln        | Gly        | -Ala       | Leu        | Pro<br>605  |            | Met        | Val        |
|            |                                 | Trp        | Gln<br>610 | Asn         | Arg             | Asp        | Val          | Tyr<br>615   | Leu          | Gln        | Gly        | Pro        | Ile<br>620 | Trp         | Ala        | Lys        | Ile        |
| 25         |                                 | Pro<br>625 | His        | Thr         | Asp             | Gly        | Asn<br>630   | Phe          | His          | Pro        | Ser        | Pro<br>635 | Leu        | Met         | Gly        | Gly        | Phe<br>640 |
| 30         |                                 | Gly        | Leu        | Lys         | His             | Pro<br>645 | Pro          | Pro          | Gln          | Ile        | Leu<br>650 | Ile        | Lys        | neA         | Thr        | Pro<br>655 | Val        |
|            |                                 | Pro        | Ala        | Asp         | Pro<br>660      | Pro        | Thr          | Thr          | Phe          | Ser<br>665 | Gln        | Ala        | Lys        | Leu         | Ala<br>670 | Ser        | Phe        |
| 35         |                                 | Ile        | Thr        | Gln<br>675  | Tyr             | Ser        | Thr          | Gly          | Gln<br>680   | Val        | Ser        | Val        | Glu        | Ile<br>685  | Glu        | Trp        | Glu        |
| 40         |                                 | Leu        | Gln<br>690 | Lys         | Glu             | Asn        | Ser          | Lys<br>695   | Arg          | Trp        | Asn        | Pro        | Glu<br>700 | Ile         | Gln        | Tyr        | Thr        |
|            |                                 | Ser<br>705 | Asn        | Tyr         | Tyr             | Lys        | Ser<br>710   | Thr          | Asn          | Val        |            | Phe<br>715 |            | Val         | Asn        | Thr        | Glu<br>720 |
| 45         |                                 |            |            | Tyr         | Ser             | Glu<br>725 | Pro          | Arg          | Pro          | Ile        | Gly '      | Thr        | Arg        | Tyr         |            | Thr<br>735 | Arg        |
| 5 <i>0</i> |                                 | Asn        | Leu        |             |                 |            |              |              |              |            |            |            |            |             |            |            |            |
|            | <210> 93<br><211> 73<br><212> P | 38<br>RT   |            | _ 2 . 4 . 4 |                 |            |              | 40.          |              |            |            |            |            |             |            |            |            |
| 55         | <213> ca                        |            | rotein     | ot AA'      | v serc          | type,      | cione        | 43.1         |              |            |            |            |            |             |            |            |            |

|           |   | Met<br>1   | Ala        | . Ala      | Asp        | Gly<br>5   | Туг        | : Leu      | Pro        | Asp        | Trp<br>10  | Leu               | Glu        | qeA ı      | neA o      | 15         | Ser        |
|-----------|---|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|-------------------|------------|------------|------------|------------|------------|
| 5         |   | Glu        | Gly        | Ile        | Arg<br>20  | Glu        | Trp        | Trp        | Asp        | Leu<br>25  | Lys        | Pro               | Gly        | Ala        | Pro<br>30  | Lys        | Pro        |
| 10        |   | Lys        | Ala        | Asn<br>35  | Gln        | Gln        | Lys        | Gln        | Asp<br>40  | Asp        | Gly        | Arg               | Сlу        | Leu<br>45  | Val        | Leu        | Pro        |
|           |   | Gly        | туг<br>50  | Lys        | Tyr        | Leu        | Gly        | Pro<br>55  | Phe        | Asn        | Gly        | Leu               | Asp<br>60  | Lys        | Gly        | Glu        | Pro        |
| 15        |   | Val<br>65  | Asn        | Ala        | Ala        | · Asp      | Ala<br>70  | Ala        | Ala        | Leu        | Glu        | His<br>75         | Asp        | Lys        | Ala        | Tyr        | Asp<br>08  |
| 20        |   | Gln        | Gln        | Leu        | Lys        | Ala<br>85  | Gly        | Asp        | Asn        | Pro        | Tyr<br>90  | Leu               | Arg        | Tyr        | neA        | His<br>95  | Ala        |
|           |   | Asp        | Ala        | Glu        | Phe<br>100 | Gln        | Glu        | Arg        | Leu        | Gln<br>105 | Glu        | Asp               | Thr        | Ser        | Phe<br>110 | Gly        | Gly        |
| 25        |   | Asn        | Leu        | Gly<br>115 | Arg        | Ala        | Val.       | Phe        | Gln<br>120 | Ala        | Lys        | Lys               | Arg        | Val<br>125 | Leu        | Glu        | Pro        |
| 30        |   | Leu        | Gly<br>130 | Leu        | Val        | Glu        | Glu        | Gly<br>135 | Ala        | Lys        | Thr        | Ala               | Pro<br>140 | Gly        | Ľуз        | Lys        | Arg        |
|           | • | Pro<br>145 | Val        | Glu        | Pro        | Ser        | Pro<br>150 | Gln        | Arg        | Ser        | Pro        | <b>Asp</b><br>155 | Ser        | Ser        | Thr        | Gly        | Ile<br>160 |
| 35        |   | Gly        | Lys        | Lys        | Gly        | His<br>165 | Gln        | Pro        | Ala        | Arg        | Lys<br>170 | Arg               | Leu        | Asn        | Phe        | Gly<br>175 | Gln        |
| 40        |   | Thr        | Gly        | Asp        | Ser<br>180 | Glu        | Ser        | Val        | Pro        | Asp<br>185 | Pro        | Gln               | Pro        | Ile        | Gly<br>190 | Glu        | Pro        |
|           |   | Pro        | Ala        | Gly<br>195 | Pro        | Ser        | Gly        | Leu        | Gly<br>200 | Ser        | Gly        | Thr               | Met        | Ala<br>205 | Ala        | Gly        | Gly        |
| <b>45</b> |   | Gly        | Ala<br>210 | Pro        | Met        | Ala        | qeA        | Asn<br>215 | Asn        | Glu        | Gly        | Ala               | Asp<br>220 | Gly        | Val        | G1y        | Ser        |
| <i>50</i> |   | Ser<br>225 | Ser        | Gly        | Asn        | Trp        | His<br>230 | Cys        | Asp        | Ser        | Thr        | Trp<br>235        | Leu        | Gly        | qeA        | Arg        | Val<br>240 |
|           | ÷ | Ile        | Thr        | Thr        | Ser        | Thr<br>245 | Arg        | Thr        | Trp        | Ala        | Leu<br>250 | Pro               | Thr        | Tyr        |            | Asn<br>255 | His        |
|           |   |            |            |            |            |            |            |            |            |            |            |                   |            |            |            |            |            |

| 5          |   | €          | su Ty      | Yr Ly      | /s G1<br>28        | in II       | .e Se        | r As       | n Gl         | у ТЬ<br>26 |              | r Gl          | y Gl       | y Se         | r Th<br>27 |             | n Asj        |
|------------|---|------------|------------|------------|--------------------|-------------|--------------|------------|--------------|------------|--------------|---------------|------------|--------------|------------|-------------|--------------|
|            |   | As         | n Th       | r Ty<br>27 | r Ph               | e Gl        | у Ту         | r Se       | r Th:        |            | o Tr         | p Gl          | у Ту       | r Ph<br>28   |            | p Ph        | e Ası        |
| 10         |   | Ar         | g Ph<br>29 | e Hi       | s Cy               | s Hi        | s Ph         | e Se:      | r Pro        | o Ar       | g As         | p Tr          | 9 G1<br>30 |              | g Le       | u Il        | e Ası        |
|            |   | As<br>30   | n As<br>5  | n Tr       | p Gl               | y Pb        | в Аго<br>310 | g Pro      | o Lys        | Ar         | g Lei        | 12 Ası<br>315 |            | e Ly:        | s Le       | u Ph        | e Asr<br>320 |
| 15         |   | Il         | e Gl       | n Va       | 1 Ly:              | s Gl:<br>32 | u Val        | Thi        | r ,Gln       | Ası        | n Gli<br>330 |               | Thi        | r Lys        | 3 Thi      | r Ile<br>33 | e Ala<br>5   |
| 20         |   | Ası        | n As:      | n Lei      | u Th:              | r Sei       | r Thr        | : Ile      | Gln          | Va]<br>345 | l Phe        | thr:          | : Asr      | Sez          | Glu<br>350 |             | c Gln        |
|            |   | Lei        | ı Pr       | 35!        | val                | l Pro       | o Gly        | Ser        | Ala<br>360   | His        | Gln          | Gly           | Суз        | 1 Leu<br>365 |            | Pro         | Phe          |
| <b>2</b> 5 |   | Pro        | 370        | a Asp      | Val                | . Phe       | : Met        | Ile<br>375 | Pro          | Gln        | Tyr          | Gly           | туг<br>380 |              | The        | Leu         | Asn          |
| 30         |   | Asn<br>385 | . Gly      | / Ser      | Glm                | Ala         | Val<br>390   | Gly        | Arg          | Ser        | Ser          | Pbe<br>395    | Tyr        | Суз          | Leu        | Glu         | Tyr<br>400   |
|            |   | Phe        | Pro        | Ser        | Gln                | Met<br>405  | Leu          | Arg        | Thr          | Gly        | Asn<br>410   | Asn           | Phe        | Glu          | Phe        | Ser<br>415  |              |
| 35         |   | Thr        | Phe        | Glu        | Asp<br>420         | Val         | Pro          | Phe        | His          | Ser<br>425 | Ser          | Tyr           | Ala        | His          | Ser<br>430 |             | Ser          |
| 40         |   | Leu        | qeA        | Arg<br>435 | Leu                | Met         | Asn          | Pro        | Leu<br>440   | Ile        | Ąsp          | Gln           | Tyr        | Leu<br>445   | Tyr        | Tyr         | Leu          |
|            |   | Ser        | Arg<br>450 | Thr        | Gln                | Ser         | Thr          | Gly<br>455 | Gly          | Thr        | Gln          | Gly           | Thr<br>460 | Gln          | Gln        | Гел         | Leu          |
| 45         |   | Phe<br>465 | Ser        | Gln        | Ala                | Gly         | Pro<br>470   | Ala        | asA          | Met        | Ser          | Ala<br>475    | Gln        | Ala          | Lys        | Asn         | Trp<br>480   |
| 50         | , | Leu        | Pro        | Gly        | Pro                | Суз<br>485  | Tyr          | Arg        | Gln          | Gln        | Arg<br>490   | Val           | Ser        | Thr          | Thr        | Leu<br>495  | Ser          |
|            | ; | Gln        | Asn        | Asn        | <b>As</b> n<br>500 | Ser         | neA          | Phe        | Ala          | Trp<br>505 | Thr          | Gly           | Ala        | Thr          | Lys<br>510 | Tyr         | His          |
| 55         |   | Leu        | Asn        | Gly<br>515 | Arg                | Asp         | Ser          |            | Val 2<br>520 | Asn        | Pro          | Gly           | Val        | Ala<br>525   | Met        | Ala         | Thr          |

|            |                           | His        | 1ys<br>530 |            | Asp        | Glu        | Glu        | Arg<br>535         | Phe        | Phe        | Pro        | Ser        | Ser<br>540 |            | Val        | Leu        | Met        |
|------------|---------------------------|------------|------------|------------|------------|------------|------------|--------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| 5          |                           | Phe<br>545 | Gly        | ŗys        | Gln        | Gly        | Ala<br>550 | Gly                | Lya        | Asp        | neA o      | Val<br>555 |            | Tyr        | Ser        | Ser        | Val<br>560 |
| 10         |                           | Met        | Leu        | Thr        | Ser        | Glu<br>565 | Glu        | Glu                | Ile        | Lys        | Thr<br>570 | Thr        | neA        | Pro        | Val        | Ala<br>575 | ',Thr      |
|            |                           | Glu        | Gln        | Tyr        | Gly<br>580 | Val        | Val        | Ala                | Asp        | Asn<br>585 |            | Gln        | Gln        | Thr        | Asn<br>590 | _          | Ala        |
| 15         |                           | Pro        | Ile        | Val<br>595 | Gly        | Thr        | Val        | neA                | Ser<br>600 | Gln        | Gly        | Ala        |            | Pro<br>605 | Gly        | Met        | Val        |
| 20         |                           | Trp        | Gln<br>610 | neA        | Arg        | qeA        | Val        | Tyr<br>615         | Leu        | Gln        | ely        | Pro        | Ile<br>620 | Trp        | Ala        | Lys        | Ile        |
| 25         |                           | Pro<br>625 | His        | Thr        | Asp        | Gly        | Asn<br>630 | Phe                | His        | Pro        | Ser        | Pro<br>635 | Leu        | Met        | Gly        | Gly        | Phe<br>640 |
|            |                           | Gly        | Leu        | Lys        | His        | Pro<br>645 | Pro        | Pro                | Gln        | Ile        | Leu<br>650 | Val        | Lys        | Asn        | Thr        | Pro<br>655 | Val        |
| 30         |                           | Pro        | Ala        | Asp        | Pro<br>660 | Pro        | Thr        | Thr                | Phe        | Ser<br>665 | Gln        | Ala        | Lys        | Leu        | Ala<br>670 | Ser        | Phe        |
| 35         |                           | Ile        |            | Gln<br>675 | Tyr        | Ser        | Thr        | Gly                | Gln<br>680 | Val        | Ser'       | Val        | Glu        | Ile<br>685 | Glu        | Trp        | Glu        |
|            |                           | Leu        | Gln<br>690 | ГÀЗ        | Glu        | neA        | Ser        | Lys<br>695         | Arg        | Trp        | Asn        | Pro        | Glu<br>700 | Ile        | Gln        | Tyr        | Thr        |
| 40         |                           | Ser<br>705 | Asn        | Tyr        | Tyr        |            | Ser<br>710 | Thr                | Asn        | Val        | Asp        | Phe<br>715 | Ala        | Val        | Asn        | Thr        | Glu<br>720 |
| 45         |                           | Gly        | Thr        | Tyr        | Ser        | Glu<br>725 | Pro        | Arg                | Pro        | Ile        | Gly<br>730 | Thr        | Arg        | Tyr        | Leu        | Thr<br>735 | Arg        |
|            |                           | Asn        | Leu        |            |            |            |            |                    |            |            |            |            |            |            |            |            |            |
| 50         | <210><211><211><212><213> | 738        | ratein     | of AA      | V serc     | ntvne      | clone      | <b>43 1</b> 2      | :          |            |            |            |            | •          |            |            |            |
| <b>5</b> 5 | <400>                     |            | . 5.011    | J. / V1    | . 5510     | yμε, .     | 5101 TE    | <del>7</del> 0, 12 |            |            |            |            |            |            |            |            |            |

|    | Me<br>1    | t Al        | a Al        | a As       | p G1<br>5         | у Ту        | r Le       | u Pr                    | o As       | p Tr<br>10 |            | u Gl       | eA u.       | eA q       | n Le<br>15 |             |
|----|------------|-------------|-------------|------------|-------------------|-------------|------------|-------------------------|------------|------------|------------|------------|-------------|------------|------------|-------------|
| 5  | Gl         | u Gl        | y Il        | e Ar<br>20 | g Gl              | u Tr        | p Tr       | p As                    | p Le<br>25 | u Ly       | s Pr       | o G1       | y Al        | a Pr<br>30 | o Ly       | s Pr        |
| 10 | Ly         | s Al        | a As:<br>35 | n Gl:      | n Gl              | n Ly        | s Gl       | n As <sub>j</sub><br>40 | e As       | p Gl       | ,<br>A Yr  | g Gl       | y Le:<br>45 | u Va       | l Le       | u Pro       |
|    | Gl;        | у Ту:<br>50 | r Ly:       | з Ту       | r Le              | u Gl        | y Pro      | o Phe                   | e As:      | n Gly      | y Le       | 4 As<br>60 |             | 3 G1       | y Gl       | u Pro       |
| 15 | Va:<br>65  | l Ası       | n Ala       | L Ala      | a As <sub>l</sub> | P Ala<br>70 | a Ala      | a Ala                   | ı Leı      | u Gli      | 1 Hi:      | 3 As       | p Lys       | s Ala      | а Ту       | qeA =<br>08 |
| 20 | Glr        | Glr         | Leu         | Lys        | 85                | e Gl        | / Asp      | Asn                     | Pro        | 90         | Lev        | Arç        | Tyr         | : Ası      | His<br>95  | . Ala       |
|    | Asp        | Ala         | . Glu       | Phe<br>100 | Glr               | ı Glu       | Arg        | , Leu                   | Glr<br>105 | Glu        | Asp        | Thr        | : Ser       |            | e Gly      | Gly         |
| 25 | Asn        | Leu         | Gly<br>115  | Arg        | Ala               | Val         | . Phe      | Gln<br>120              | Ala        | Lys        | Lys        | Arg        | Val<br>125  |            | Glu        | Pro         |
| 30 | Leu        | Gly<br>130  | Leu         | Val        | Glu               | Glu         | Gly<br>135 | Ala                     | Lys        | Thr        | Ala        | Pro<br>140 | Gly         | Lys        | Lys        | Arg         |
|    | Pro<br>145 | Val         | Glu         | Pro        | Ser               | Pro<br>150  | Gln        | Arg                     | Ser        | Pro        | Asp<br>155 | Ser        | Ser         | Thr        | Gly        | Ile<br>160  |
| 35 | еĵу        | Lys         | Lys         | Gly        | His<br>165        | Gln         | Pro        | Ala                     | Arg        | Lys<br>170 | Arg        | Leu        | Asn         | Phe        | Gly<br>175 | Gln         |
| 40 | Thr        | Gly         | Азр         | Ser<br>180 | Glu               | Ser         | Val        | Pro                     | Asp<br>185 | Pro        | Gln        | Pro        | Ile         | Gly<br>190 | Glu        | Pro         |
|    | Pro        | Ala         | Gly<br>195  | Pro        | Ser               | Gly         | Leu        | Gly<br>200              | Ser        | Gly        | Thr        | Met        | Ala<br>205  | Ala        | Gly        | Gly         |
| 45 | Gly        | Ala<br>210  | Pro         | Met        | Ala               | Asp         | Asn<br>215 | Asn                     | Glu        | ely        | Ala        | Asp<br>220 | Gly         | Val        | Gly        | Ser         |
| 50 | Ser<br>225 | Ser         | Gly         | Asn        | Trp               | His<br>230  | Cys        | Asp                     | Ser        | Thr        | Trp<br>235 | Leu        | Gly         | Asp        | Arg        | Val<br>240  |
|    | Ile        | Thr         | Thr         | Ser        | Thr<br>245        | Arg         | Thr        | Trp .                   |            | Leu<br>250 | Pro        | Thr        | Tyr .       |            | Asn<br>255 | His         |

|    |   | Leu        | Tyr        | Lys        | Gln<br>260 |            | . Ser      | Asn        | . Gly      | 7 hr<br>265 |                    | . elà      | Gly        | , Ser                   | 270        |            | qeA ı      |
|----|---|------------|------------|------------|------------|------------|------------|------------|------------|-------------|--------------------|------------|------------|-------------------------|------------|------------|------------|
| 5  |   | Asn        | Thr        | Tyr<br>275 |            | Gly        | Tyr        | : Ser      | Thr<br>280 |             | Trp                | Gly        | Туг        | Phe<br>285              | _          | Phe        | Asn        |
| 10 |   | Arg        | Phe<br>290 |            | Cys        | His        | Phe        | Ser<br>295 |            | Arg         | Asp                | Trp        | Gln<br>300 |                         | Leu        | Ile        | Asn        |
|    |   | Asn<br>305 |            | Trp        | Gly        | Phe        | Arg<br>310 |            | Lys        | Arg         | Leu                | Asn<br>315 | Phe        | Lys                     | Leu        | Phe        | Asn<br>320 |
| 15 |   | Île        | Gln        | Val        | Lys        | Glu<br>325 | Val        | Thr        | Gln        | neA         | 330<br>GJ <i>n</i> | Gly        | Thr        | Lys                     | Thr        | Ile<br>335 | Ala        |
| 20 |   | Asn        | Asn        | Leu        | Thr<br>340 | Ser        | Thr        | Ile        | Gln        | Val<br>345  | Phe                | Thr        | Asp        | Ser                     | Glu<br>350 | Тyr        | Gln        |
|    |   | Leu        | Pro        | Tyr<br>355 | Val        | Leu        | Gly        | Ser        | Ala<br>360 | His         | Gln                | Gly        | Суз        | Leu<br>365              | Pro        | Pro        | Phe        |
| 25 |   | Pro        | Ala<br>370 | Asp        | <b>Val</b> | Phe        | Met        | Ile<br>375 | Pro        | Gln         | Tyr                | Gly        | Tyr<br>380 | Leu                     | Thr        | Leu        | Asn        |
| 30 | · | Asn<br>385 | Gly        | Ser        | Gln        | Ala        | Val<br>390 | Gly        | Arg        | Ser         | Ser                | Phe<br>395 | Tyr        | Cys                     | Leu        | Glu        | Tyr<br>400 |
|    |   | Phe        | Pro        | Ser        | Gln        | Met<br>405 | Leu        | Arg        | Thr        | Gly         | Asn<br>410         | Asn        | Phe        | Glu                     | Phe        | Ser<br>415 | Tyr        |
| 35 |   | Thr        | Phe        | Glu        | Asp<br>420 | Val        | Pro        | Phe        | His        | Ser<br>425  | Ser                | Tyr        | Ala        | His                     | ser<br>430 | Gln        | Ser        |
| 40 |   | Leu        | Asp        | Arg<br>435 | Leu        | Met        | Asn        | Pro        | Leu<br>440 | Ile         | Asp                | Gln        | Tyr        | Leu <sup>.</sup><br>445 | Tyr        | Tyr        | Leu        |
|    |   | Ser        | Arg<br>450 | Thr        | Gln        | Ser        | Thr        | Gly<br>455 | Gly        | Thr         | Gln                | Gly        | Thr<br>460 | Gln                     | Gln        | Leu        | Leu        |
| 45 |   | Phe<br>465 | Ser        | Gln        | Ala        | Gly        | Pro<br>470 | Ala        | Asn        | Met         | Ser                | Ala<br>475 | Gln        | Ala                     | Lys        | Asn        | Trp<br>480 |
| 50 |   | Leu        | Pro        | Gly        | Pro        | Cys<br>485 | Tyr        | Arg        | Gln        | Gln         | Arg<br>490         | Val        | Ser        | Thr                     | Thr        | Leu<br>495 | Ser        |
|    | , | Gln        | Asn        | Asn        | Asn<br>500 | Ser        | neA        | Phe        | Ala        | Trp<br>505  | Thr                | Gly        | Ala        | Thr                     | Lys<br>510 | Tyr        | His        |
| 55 |   |            |            |            |            |            |            |            |            |             |                    |            |            |                         |            |            |            |

|    |                                   | Lev        | Asr        | 515        |            | , Asp      | Sei        | : Leu      | 520        |                   | n Pro      | o Gly      | Va]        | 525        |            | : Ala      | Thr               |
|----|-----------------------------------|------------|------------|------------|------------|------------|------------|------------|------------|-------------------|------------|------------|------------|------------|------------|------------|-------------------|
| 5  |                                   | His        |            |            | Asp        | Glu        | Gli        | Arg<br>535 |            | Phe               | Pro        | Ser        | Sez<br>540 |            | Va]        | Lei        | Met               |
| 10 |                                   | Phe<br>545 |            | Lys        | Glm        | Gly        | Ala<br>550 |            | Lys        | Asp               | Asn        | Val<br>555 |            | Tyr        | Ser        | Ser        | Val<br>560        |
|    |                                   | Met        | Leu        | Thr        | Ser        | Glu<br>565 | Glu        | Glu        | Ile        | Lys               | Thr<br>570 |            | Asn        | Pro        | Val        | Ala<br>575 | Thr               |
| 15 |                                   | Glu        | Gln        | Tyr        | Gly<br>580 |            | Val        | Ala        | Asp        | Asn<br>585        |            | Gln        | Gln        | Thr        | Asn<br>590 | Gly        | Ala               |
| 20 |                                   | Pro        | Ile        | Val<br>595 | Gly        | Thr        | Val        | Asn        | Şer<br>600 | Gln               | Gly        | Ala        | Leu        | Pro<br>605 | Gly        | Met        | Val               |
|    |                                   | Trp        | Gln<br>610 | neA        | Arg        | Asp        | Val        | Tyr<br>615 | Leu        | Gln               | Gly        | Pro        | Ile<br>620 | Trp        | Ala        | Lys        | Ile               |
| 25 |                                   | Pro<br>625 | His        | Thr        | Ąsp        | Gly        | neA<br>630 | Phe        | His        | Pro               | Ser        | Pro<br>635 | Leu        | Met        | Gly        | Gly        | Phe<br>640        |
| 30 |                                   | Gly        | Leu        | Lys        | His        | Pro<br>645 | Pro        | Pro        | Gln        | Ile               | Leu<br>650 | Val        | Lys        | Asn        | Thr        | Pro<br>655 | Val               |
|    |                                   | Pro        | Ala        | Asp        | Pro<br>660 | Pro        | Thr        | Thr        | Phe        | <b>Ser</b><br>665 | Gln        | Ala        | Lys        | Leu        | Ala<br>670 | Ser        | Phe               |
| 35 |                                   | Ile        | Thr        | Gln<br>675 | Tyr        | Ser        | Thr        | Gly        | Gln<br>680 | Val               | Ser        | Val        | Glu        | Ile<br>685 | Glu        | Trp        | Glu               |
| 0  |                                   | Leu        | Gln<br>690 | Lys        | Glu        | Asn        | Ser        | Lys<br>695 | Arg        | Trp               | Asn        | Pro        | Glu<br>700 | Ile        | Gln        | Tyr        | Thr               |
|    |                                   | Ser<br>705 | Asn        | Tyr        | Tyr        | Lys        | Ser<br>710 | Thr        | Asn        | Val               | Asp        | Phe<br>715 | Ala        | Val        | Asn        | Thr        | <b>Glu</b><br>720 |
| 5  |                                   | Gly        | Thr        | Tyr        | Ser        | Glu<br>725 | Pro        | Arg        | Pro        | Ile               | Gly<br>730 | Thr        | Arg        | Tyr        | Leu        | Thr<br>735 | Arg               |
| 0  |                                   | Asn        | Leu        |            |            |            |            |            |            |                   |            |            |            |            |            |            |                   |
|    | <210> 94<br><211> 738<br><212> PR | Т          |            |            |            |            |            |            |            |                   |            |            |            |            |            |            |                   |
| 5  | <213> car                         | osid pro   | otein d    | of AAV     | / sero     | type, c    | olone -    | 43.5       |            |                   |            |            |            |            |            |            |                   |

<400> 94

|            |   | Me           | E Ala       | a Ala       | a Asp      | 5<br>5     | у Ту:       | . Let      | Pro         | Asp        | Trp<br>10  | Leu          | Gl:        | u Asj       | ASI        | n Lei<br>15 | ı Ser      |
|------------|---|--------------|-------------|-------------|------------|------------|-------------|------------|-------------|------------|------------|--------------|------------|-------------|------------|-------------|------------|
| 5          |   | Gli          | u Gl;       | / Ile       | Arg<br>20  | Glu        | ı Trş       | Trp        | ge <i>A</i> | Lev<br>25  | ı Lys      | Pro          | Gly        | y Ala       | Pro<br>30  | o Lys       | Pro        |
| 10         |   | Ly           | 3 Ala       | a Asr<br>35 | Gln        | Glr        | Lys         | Gln        | Asp<br>40   | Asp        | Gly        | 'Arg         | Gly        | / Let<br>45 | val        | L Leu       | Pro        |
|            |   | Gl           | 7 Tyr<br>50 | : Lys       | Tyr        | Leu        | Gly         | Pro<br>55  | Phe         | Asn        | Gly        | Leu          | Asp<br>60  | Lys         | Gly        | Glu         | Pro        |
| 15         |   | Val<br>65    | neA .       | Ala         | Ala        | Asp        | Ala<br>70   | , Ala      | Ala         | Leu        | Glu        | His<br>75    | Asp        | Lys         | Ala        | Tyr         | qeA<br>08  |
| 20         |   | Gln          | Gln         | . Leu       | Lys        | Ala<br>85  | Gly         | Asp        | Asn         | Pro        | Tyr<br>90  | Leu          | Arg        | Tyr         | Asn        | His<br>95   | Ala        |
|            |   | Asp          | Ala         | Glu         | Phe<br>100 | Gln        | Glu         | Arg        | Leu         | Gln<br>105 | Glu        | qeA          | Thr        | Ser         | Phe<br>110 |             | Gly        |
| 25         |   | <b>A.S</b> n | Leu         | Gly<br>115  | Arg        | Ala        | Val         | Phe        | Gln<br>120  | Ala        | Lys        | Lys          | Arg        | Val<br>125  | Leu        | Glu         | Pro        |
| 3 <i>0</i> |   | Leu          | Gly<br>130  | Leu         | Val        | Glu        | Glu         | Gly<br>135 | Ala         | Lys        | Thr        | Ala          | Pro<br>140 | Gly         | Lys        | Lys         | Arg        |
|            |   | Pro<br>145   | Val         | Glu         | Pro        | Ser        | Pro<br>150  | Gln        | Arg         | Ser        | Pro        | Asp<br>155   | Ser        | Ser         | Thr        | Gly         | Ile<br>160 |
| 35         |   | Gly          | Lys         | Lys         | еĵу        | His<br>165 | Gln         | Pro        | Ala         | Arg        | Lys<br>170 | Arg          | Leu        | Asn         | Phe        | Gly<br>175  | Gln        |
| 40         |   | Thr          | Gly         | qeA         | Ser<br>180 | Glu        | Ser         | Val        | Pro         | Asp<br>185 | Pro        | Gln          | Pro        | Ile         | Gly<br>190 | Glu         | Pro        |
|            |   | Pro          | Ala         | Gly<br>195  | Pro        | Ser        | <u>G</u> ly |            | Gly<br>200  | Ser        | Gly        | Thr          | Met        | Ala<br>205  | Ala        | Gly         | Gly        |
| 15         |   |              | 210         |             |            |            |             | 215        |             |            |            |              | 220        |             |            | Gly         |            |
| 50         |   | Ser<br>225   | Ser         | Gly         | Asn        | Trp        | His<br>230  | Суз        | Asp         | Ser        | Thr        | Trp :<br>235 | Leu        | Gly         | Asp        | Arg         | Val<br>240 |
|            | ٠ | Ile          | Thr         | Thr         | Ser        | Thr<br>245 | Arg         | Thr        | Trp .       |            | Leu<br>250 | Pro '        | Thr        | Tyr         |            | Asn<br>255  | His        |

|           |   | Leu        | Tyr        | Lys        | Gln<br>260 |            | . Ser      | Asn        | Gly        | Thr<br>265 |            | Gly        | Gly        | Ser        | Thr<br>270 |            | qeA        |
|-----------|---|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| 5         |   | Asn        | Thr        | Tyr<br>275 |            | Gly        | Tyr        | Ser        | Thr<br>280 |            | Trp        | Gly        | Tyr        | Phe<br>285 |            | Phe        | Asn        |
| 10        |   | Arg        | Phe<br>290 |            | Суз        | His        | Phe        | Ser<br>295 |            | Arg        | Asp        | Trp        | Gln<br>300 |            | Leu        | Ile        | neA,       |
|           |   | Asn<br>305 |            | Trp        | Gly        | Phe        | Arg<br>310 |            | Lys        | Arg        | Leu        | Asn<br>315 |            | Lys        | Leu        | Phe        | Asn<br>320 |
| 15        |   | Ile        | Gln        | Val        | Lys        | Glu<br>325 | Val        | Thr        | Gln        | Asn        | Glu<br>330 |            | Thr        | Lys        | Thr        | Ile<br>335 | Ala        |
| 20        |   | ·Asn       | Asn        | Leu        | Thr<br>340 | Ser        | Thr        | Ile        | Gln        | Val<br>345 | Phe        | Thr        | Asp        | Ser        | Glu<br>350 | Tyr        | Gln        |
|           |   | Leu        | Pro        | Tyr<br>355 | Val        | Leu        | Gly        | Ser        | Ala<br>360 | His        | Gln        | Gly        | Cys        | Leu<br>365 | Pro        | Pro        | Phe        |
| 25        |   | Pro        | Ala<br>370 | Ąsp        | Val        | Phe        | Met        | Ile<br>375 | Pro        | Gln        | Tyr        | Gly        | Tyr<br>380 | Leu        | Thr        | Leu        | Asn        |
| 30        |   | Asn<br>385 |            | Ser        | Gln        | Ala        | Val<br>390 | Gly        | Arg        | Ser        | Ser        | Phe<br>395 | Tyr        | Суз        | Leu        | Glu        | Tyr<br>400 |
|           |   | Phe        | Pro        | Ser        | Gln        | Met<br>405 | Leu        | Arg        | Thr        | Gly        | Asn<br>410 | Asn        | Phe        | Glu        | Phe        | Ser<br>415 | Tyr        |
| 35        |   | Thr        | Phe        | Glu        | Asp<br>420 | Val        | Pro        | Phe        | His        | Ser<br>425 | Ser        | Tyr        | Ala        | His        | Ser<br>430 | Gln        | Ser        |
| 40        |   | Leu        | Asp        | Arg<br>435 | Leu        | Met        | Asn        | Pro        | Leu<br>440 | Ile        | qeA        | Gln        | Tyr        | Leu<br>445 | Tyr        | Tyr        | Leu        |
|           |   | Ser        | Arg<br>450 | Thr        | Gln        | Ser        | Thr        | Gly<br>455 | elà        | Thr        | Gln        | Gly        | Thr<br>460 | Gln        | Gln        | Leu        | Leu        |
| 45        |   | Phe<br>465 | Ser        | Gln        | Ala        | Gly        | Pro<br>470 | Ala        | neA        | Met        | Ser        | Ala<br>475 | Gln        | Ala        | Lys        | neA        | Trp<br>480 |
| 50        |   | Leu        | Pro        | Gly        | Pro        | Cys<br>485 | Tyr        | Arg        | Gln        | Gln        | Arg<br>490 | Val        | Ser        | Thr        | Thr        | Leu<br>495 | Ser        |
| 55        | • | Gln        | neA        | neA        | Asn<br>500 | Ser        | Asn        | Phe        | Ala        | Trp<br>505 | Thr        | Gly        | Ala        | Thr        | Lys<br>510 | Tyr        | His        |
| <i>55</i> |   |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |

|           |                                                  | Leu          | Asn        | 515        | -          | Asp        | Ser        | Leu        | 520        |            | Pro        | GIA        | Val        | 525        |            | Ala        | Thr        |
|-----------|--------------------------------------------------|--------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| 5         |                                                  | His          | Lys<br>530 | -          | Asp        | Glu        | Glu        | Arg<br>535 |            | Phe        | Pro        | Ser        | Ser<br>540 |            | Val        | Leu        | Met        |
| 10        |                                                  | Phe<br>545   | Gly        | Lys        | Ġ[n        | Gly        | Ala<br>550 |            | Lys        | Asp        | Asn        | Val<br>555 |            | Tyr        | Ser        | Ser        | Val<br>560 |
|           | ;                                                | Met          | Leu        | Thr        | Ser        | 565        | Glu        | Glu        | Ile        | Lys        | Thr<br>570 | Thr        | Asn        | Pro        | Val        | Ala<br>575 | Thr        |
| 15        | (                                                | Glu          | Gln        | Tyr        | Gly<br>580 | Val        | Val        | Ala        | Asp        | Asn<br>585 | Leu        | Gln        | Gln        | Thr        | Asn<br>590 | Gly        | Ala        |
| 20        | :                                                | Pro          | Ile        | Val<br>595 | Gly        | Thr        | Val        | Asn        | Ser<br>600 | Gln        | СŢĀ        | Ala        | Leu        | Pro<br>605 | Gly        | Met        | Val        |
| <i>25</i> | •                                                | Trp          | Gln<br>610 | Asn        | Arg        | Asp        | Val        | Tyr<br>615 | Leu        | Gln        | Gly        | Pro        | Ile<br>620 | Trp        | Ala        | Lys        | Ile        |
|           |                                                  | Pro<br>625   | His        |            | qeA        | Gly        | Asn<br>630 | Phe        | His        | Pro        | Ser        | Pro<br>635 | Leu        | Met        | еŢУ        | Gly        | Phe<br>640 |
| 30        | C                                                | <b>Gly</b>   | Leu        | Lys        | His        | Pro<br>645 | Pro        | Pro        | Gln        | Ile        | Leu<br>650 | Val        | Lys        | Asn        | Thr        | Pro 655    | Val        |
| 35        | I                                                | Pro          | Ala        | Asp        | Pro<br>660 | Pro        | Thr        | Thr        | Phe        | Ser<br>665 | Gln        | Ala        | Lys        | Leu        | Ala<br>670 | Ser        | Phe        |
|           | :                                                | Ile          | Thr        | Gln<br>675 | Tyr        | Ser        | Thx        | Gly        | Gln<br>680 | Val        | Ser        | Val        | Glu        | Ile<br>685 | Glu        | Trp        | Glu        |
| 40        | I                                                |              | Gln<br>690 | Lys        | Glu        | aeA        | ser        | Lys<br>695 | Arg        | Trp        | Asn        | Pro        | Glu<br>700 | Ile        | Gln        | Tyr        | Thr        |
| 45        |                                                  | Ser .<br>705 | Asn        | Tyr        | Tyr        | Lys        | Ser<br>710 | Thr        | Asn        | Val        | Asp        | Phe<br>715 | Ala        | Val        | Asn        | Thr        | Glu<br>720 |
| 40        |                                                  | ;ly          | Thr        | Tyr        | Ser        | G1u<br>725 | Pro        | Arg        | Pro        | Ile        | Gly<br>730 | Thr        | Arg        | Tyr        | Leu        | Thr<br>735 | Arg        |
| 50        | <b>,</b>                                         | Asn          | Leu        |            |            |            |            |            | •          |            |            |            |            |            |            |            |            |
| <i>55</i> | <210> 95<br><211> 738<br><212> PRT<br><213> caps | Γ            | otein      | of AA\     | V serc     | otype,     | clone      | AAV8       |            |            |            |            |            |            |            |            |            |

<400> 95

|    | Met<br>1   | : Ala     | a Ala      | a Asp       | 5 Gly     | / Тух      | : Leu     | ı Pro      | As <sub>y</sub> | Trp<br>10 | Lei        | ı Glı     | ı Ası       | ) Asr      | Let<br>15 | 1 Ser      |
|----|------------|-----------|------------|-------------|-----------|------------|-----------|------------|-----------------|-----------|------------|-----------|-------------|------------|-----------|------------|
| 5  | G1ı        | ı Gly     | y Ilo      | a Arg<br>20 | Glu       | Trp        | Trp       | Ala        | Let<br>25       | ı Lys     | Pro        | o Gly     | / Ala       | Pro<br>30  | Lys       | Pro        |
| 10 | Lys        | Ala       | 35         | n Gln       | Gln       | Lys        | Gln       | 40         | Asp             | 61)       | / Arç      | , eJ?     | / Let<br>45 | ı Val      | . Leu     | Pro        |
|    | Gly        | Tyr<br>50 | : Lys      | Tyr         | Leu       | Gly        | Pro<br>55 | Phe        | ne.A :          | Gly       | Leu        | Asp<br>60 | Lys         | Gly        | Glu       | Pro        |
| 15 | 65         | Asn       | Ala        | Ala         | qeA       | Ala<br>70  | Ala       | Ala        | Leu             | Glu       | His<br>75  | Asp       | Lys         | Ala        | Tyr       | qeA<br>08  |
| 20 | Gln        | Gln       | Leu        | . Gln       | Ala<br>85 | Gly        | Ąsp       | Asn        | Pro             | Tyr<br>90 | Leu        | Arg       | Tyr         | Asn        | His<br>95 | Ala        |
|    | Asp        | Ala       | Glu        | Phe<br>100  | Gln       | Glu        | Arg       | Leu        | Gln<br>105      | Glu       | Asp        | Thr       | Ser         | Phe<br>110 | Gly       | Gly        |
| 25 |            |           | 115        | Arg         |           |            |           | 120        |                 |           |            |           | 125         |            |           |            |
| 30 |            | 130       |            | Val         |           |            | 135       |            |                 |           |            | 140       |             |            |           |            |
|    | 145        |           |            | Pro         |           | 150        |           |            |                 |           | 155        |           |             |            |           | 160        |
|    |            |           |            | Gly         | 165       |            |           |            |                 | 170       |            |           |             |            | 175       |            |
| 40 |            |           |            | Ser<br>180  |           |            |           |            | 185             |           |            |           |             | 190        |           |            |
|    | Pro        | Ala       | Ala<br>195 | Pro         | Ser       | Gly        | Val       | Gly<br>200 | Pro             | Asn       | Thr        | Met       | Ala<br>205  | Ala        | ely       | Gly        |
| 45 |            | 210       |            | Met :       |           |            | 215       |            |                 |           |            | 220       |             |            |           |            |
| 50 | Ser<br>225 | Ser       | Gly        | Asn !       | Trp :     | His<br>230 | . ayo     | Asp        | Ser '           |           | Trp<br>235 | Leu       | GŢÀ         | Asp .      | -         | Val<br>240 |

| _          | Ile        | Thr        | Thr        | Ser        | Thr<br>245 |            | Thr        | Trp        | Ala        | 250        |            | Thz        | Tyr        | : Asn      | 2 55       |            |
|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| 5          | Leu        | Tyr        | Lys        | Gln<br>260 |            | Ser        | Asn        | Gly        | Thr<br>265 |            | Gly        | Gly        | Ala        | Thr<br>270 | : Asn      | . Asp      |
| 10         | Asn        | Thr        | Tyr<br>275 |            | Gly        | Tyr        | Ser        | Thr<br>280 |            | Trp        | Gly        | Tyr        | Phe<br>285 | _          | Phe        | A.Sr.      |
| 15         | Arg        | Phe<br>290 |            | Суз        | His        | Phe        | Ser<br>295 |            | Arg        | qeA        | Trp        | Gln<br>300 |            | Leu        | Ile        | Asn        |
|            | Asn<br>305 | Asn        | Trp        | Gly        | Phe        | Arg<br>310 |            | Lys        | Arg        | Leu        | Ser<br>315 | Phe        | Lys        | Leu        | Phe        | Asn<br>320 |
| 20         | Ile        | Gln        | Val        | Lys        | Glu<br>325 | Val        | Thr        | Gln        | Asn        | Glu<br>330 | Gly        | Thr        | Lys        | Thr        | Ile<br>335 | Ala        |
| 25         | Asn        | neA.       | Leu        | Thr<br>340 | Ser        | Thr        | Ile        | Gln        | Val<br>345 | Phe<br>,   | Thr        | qeA        | Ser        | Glu<br>350 | Tyr        | Gln        |
|            | Leu        | Pro        | Tyr<br>355 | Val        | Leu        | Gly        | Ser        | Ala<br>360 | His        | Gln        | Gly        | Cys        | Leu<br>365 | Pro        | Pro        | Phe        |
| 30         | Pro        | Ala<br>370 | Asp        | Val        | Phe        | Met        | Ile<br>375 | Pro        | Gln        | Tyr        | Gly        | Tyr<br>380 | Leu        | Thr        | Leu        | αεA        |
| <i>35</i>  | Asn<br>385 | Gly        | Ser        | Gln        | Ala        | Val<br>390 | Gly        | Arg        | Ser        | Ser        | Phe<br>395 | Tyr        | Cys        | Leu        | Glu        | Tyr<br>400 |
| ·          | Phe        | Pro        | Ser        | Gln        | Met<br>405 | Leu        | Arg        | Thr        | Gly        | Asn<br>410 | Asn        | Phe        | Gln        | Phe        | Thr<br>415 | Tyr        |
| 40         | Thr        | Phe        | Glu        | Asp<br>420 | Val        | Pro        | Phe        | His        | Ser<br>425 | Ser        | Tyr        | Ala        | His        | Ser<br>430 | Gln        | Ser        |
| 45         | Leu        | Asp        | Arg<br>435 | Leu        | Met        | Asn        | Pro        | Leu<br>440 | Ile        | qzA        | Gln        | Tyr        | Leu<br>445 | Tyr        | Tyr        | Leu        |
|            |            | Arg<br>450 | Thr        | Gln        | Thr        | Thr        | Gly<br>455 | Gly        | Thr        | Ala        | Asn        | Thr<br>460 | Gln        | Thr        | Leu        | Gly        |
| 5 <b>0</b> | Phe<br>465 | Ser        | Gln        | G] À       | Сĵу        | Pro<br>470 | neA        | Thr        | Met        | Ala        | Asn<br>475 | Gln        | Ala        | Lys        | Asn        | Trp<br>480 |
| 55         | Leu        | Pro        | Gly        | Pro        | Cys<br>485 | Tyr        | Arg        | Gln        |            | Arg<br>490 | Val        | Ser        | Thr        | Thr        | Thr<br>495 | Gly        |

|    |   | Gln        | Asn        | . Asn      | Asn<br>500 |            | Asn        | Phe        | Ala        | Trp<br>505 |            | Ala        | Gly               | Thr        | Lys<br>510 | Tyr        | His        |
|----|---|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|-------------------|------------|------------|------------|------------|
| 5  |   | Leu        | Asn        | Gly<br>515 |            | Asn        | Ser        | Leu        | Ala<br>520 |            | Pro        | Gly        | Ile               | Ala<br>525 | Met        | Ala        | Thi        |
| 10 |   | His        | Lys<br>530 |            | Asp        | Glu        | Glu        | Arg<br>535 |            | · Phe      | Pro        | Ser        | Asn<br>540        |            | Ile        | Leu        | Ile        |
|    |   | Phe<br>545 |            | Lys        | Gln        | Asn        | Ala<br>550 | Ala        | Arg        | qeA        | Asn        | Ala<br>555 | Asp               | Týr        | Ser        | qeA        | Val<br>560 |
| 15 |   | Met        | Leu        | Thr        | Ser        | Glu<br>565 | Glu        | Glu        | Ile        | Lys        | Thr<br>570 | Thr        | Asn               | Pro        | Val        | Ala<br>575 |            |
| 20 |   | Glu        | Glu        | Tyr        | Gly<br>580 | Ile        | Val        | Ala        | qeA        | Asn<br>585 | Leu        | Gln        | Gln               | Gln        | Asn<br>590 | Thr        | Ala        |
| 25 |   | Pro        | Gln        | Ile<br>595 | Cly        | Thr        | Val        | Asn        | Ser<br>600 | Gln        | Gly        | Ala        | Leu               | Pro<br>605 | ely        | Met        | Val        |
|    |   | Trp        | Gln<br>610 |            | Arg        | Asp        | Val        | Tyr<br>615 | Leu        | Gln        | Gly        | Pro        | Ile<br>620        | Trp        | Ala        | Lys        | Ile        |
| 30 |   | Pro<br>625 | His        | Thr        | qeA        | Gly        | Asn<br>630 | Phe        | His        | Pro        | Ser        | Pro<br>635 | Leu               | Met        | Gly        | Gly        | Phe<br>640 |
| 35 |   | GJY        | Leu        | Lys        | His        | Pro<br>645 | Pro        | Pro        | Gln        | Ile        | Leu<br>650 | Ile        | Lys               | Asn        | Thr        | Pro<br>655 | Val        |
|    |   | Pro.       | Ala        | qeA        | Pro<br>660 | Pro        | Thr        | Thr        | Phe        | Asn<br>665 | Gln        | Ser        | Lys               | Leu        | Asn<br>670 | Ser        | Phe        |
| 40 |   | Ile        | Thr        | Gln<br>675 | Tyr        | Ser        | Thr        | Gly        | Gln<br>680 | Val        | Ser        | Val        | Glu               | Ile<br>685 | Glu        | Trp        | Glu        |
| 45 |   | Leu        | Gln<br>690 | Lys        | Glu        | Asn        | Ser        | Lys<br>695 | Arg        | Trp        | Asn        |            | <b>Glu</b><br>700 | Ile        | Gln        | Tyr        | Thr        |
|    |   | Ser<br>705 | Asn        | Tyr        | Tyr        | _          | Ser<br>710 | Thr        | Ser        | Val        | Asp        | Phe<br>715 | Ala               | Val        | Asn        | Thr        | Glu<br>720 |
| 50 | ť | G] À       | Val        | Tyr        |            | Glu<br>725 | Pro        | Arg        | Pro        |            | Gly<br>730 | Thr        | Arg               | Tyr        | Leu        | Thr<br>735 | Arg        |
|    |   | Asn        | Leu        |            |            |            |            |            |            |            |            |            |                   |            |            |            |            |
| 55 |   |            |            |            |            |            |            |            |            |            |            |            |                   |            |            |            |            |

<210> 96 <211> 736

|    | <212> ( |           | i prote    | in of A    | AV s       | erotyp    | e, clo     | ne 43.     | 21         |            |           |           |            |                   |            |           |           |
|----|---------|-----------|------------|------------|------------|-----------|------------|------------|------------|------------|-----------|-----------|------------|-------------------|------------|-----------|-----------|
| 5  | <400> 9 | 96        |            |            |            |           |            |            |            |            |           |           |            |                   |            |           |           |
|    |         | Met<br>1  | Ala        | Ala        | qeA        | Gly<br>5  | Tyr        | Leu        | Pro        | Asp        | Trp<br>10 | Leu       | Glu        | Asp               | Asn        | Leu<br>15 | ser       |
| 10 |         | Glu       | Glу        | Ile        | Arg<br>20  | Glu       | Trp        | Trp        | Asp        | Ĺeu<br>25  | Lys       | Pro       | Gly        | Ala               | Pro<br>30  | Lys       | Pro       |
| 15 |         | Lys       | Ala        | Asn<br>35  | ejn        | Gln       | Lys        | Gln        | Asp<br>40  | QeA        | Gly       | Arg       | Gly        | Leu<br>45         | Val        | Leu       | Pro       |
|    |         | Gly       | Tyr<br>50  | Lys        | Tyr        | Leu       | Gly        | Pro<br>55  | Phe        | Asn        | Gly       | Leu       | Asp<br>60  | Lys<br>           | Gly        | Glu       | Pro       |
| 20 |         | Val<br>65 | neA        | Ala        | Ala        | Asp       | Ala<br>70. | Ala        | Ala        | Leu        | Glu       | His<br>75 | Asp        | Lys               | Ala        | Tyr       | Asp<br>80 |
| 25 |         | Gln       | Gln        | Leu        | Lys        | Ala<br>85 | Gly        | Asp        | Asn        | Pro        | Tyr<br>90 | Leu       | Arg        | Tyr               | Asn        | His<br>95 | Ala       |
|    |         | Asp       | Ala        | Glu        | Phe<br>100 | Gln       | Glu        | Arg        | Leu        | &ln<br>105 | Glu       | Asp       | Thr        | Ser               | Phe<br>110 | Gly       | Gly       |
| 30 |         | Asn       | Leu        | Gly<br>115 | Arg        | Ala       | Val        | Phe        | Gln<br>120 | Ala        | Lys       | Lys       | Arg        | <b>Val</b><br>125 | Leu        | Glu       | Pro       |
| 35 |         | Leu       | Gly<br>130 | Leu        | Val        | Glu       | Glu        | Gly<br>135 | Ala        | Lys        | Thr       | Ala       | Pro<br>140 | Gly               | Lys        | Lya       | Arg       |
|    |         | Pro       | Val        | Glu        | Gln        | Ser       | Pro        | Gln        | Glu-       | Pro        | qeA       | Ser       | Ser        | Ser               | Gly        | Ile       | Gly       |

Lys Thr Gly Gln Gln Pro Ala Lys Lys Arg Leu Asn Phe Gly Gln Thr

Gly Asp Ser Glu Ser Val Pro Asp Pro Gln Pro Leu Gly Glu Pro Pro

Ala Ala Pro Ser Gly Leu Gly Pro Asn Thr Met Ala Ser Gly Gly 195 200 205

Ala Pro Met Ala Asp Asn Asn Glu Gly Ala Asp Gly Val Gly Asn Ser

|    | Ser<br>225 | _          | aeA        | Trp        | His        | Суя<br>230 | _          | Ser        | Thr        | Trp        | Leu<br>235 | _          | Asp        | Arg        | Val        | Ile<br>240 |
|----|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| 5  | Thr        | Thr        | Ser        | Thr        | Arg<br>245 |            | Trp        | Ala        | Leu        | Pro<br>250 |            | Туr        | Asn        | Asn        | His<br>255 | Leu        |
| 10 | Tyr        | Lys        | Gln        | Ile<br>260 |            | Asn        | Gly        | Thr        | Ser<br>265 | -          | Gly        | Ser        | Thr        | Asn<br>270 | -          | Asn        |
|    | Thr        | Tyr        | Phe<br>275 | _          | Туг        | Ser        | Thr        | Pro<br>280 | _          | Gly        | Tyr        | Phe        | Asp<br>285 | Phe        | Asn        | Arg        |
| 15 | Phe        | His<br>290 | Cys        | His        | Phe        | Ser        | Pro<br>295 | Arg        | Asp        | Trp        | Gln        | Arg<br>300 | Leu        | Ile        | Asn        | Asn        |
| 20 | Asn<br>305 | Trp        | Gly        | Phe        | Arg        | Pro<br>310 | Lys        | Arg        | Leu        | Asn        | Phe<br>315 | Lys        | Leu        | Phe        | Asn        | Ile<br>320 |
|    | Gln        | Val        | Lys        | Glu        | Val<br>325 | Thr        | Thr        | Asn        | Glu        | 330<br>Gly | Thr        | ŗÀa        | Thr        | Ile        | Ala<br>335 | Asn        |
| 25 | neA        | Leu        | Thr        | Ser<br>340 | Thr        | Val        | Arg        | Val        | Phe<br>345 | Thr        | qeA        | Ser        | Glu        | Tyr<br>350 | Gln        | Leu        |
| 30 | Pro        | Tyr        | Val<br>355 | Leu        | Gly        | Ser        | Ala        | His<br>360 | Gln        | Gly        | Суз        | Leu        | Pro<br>365 | Pro        | Phe        | Pro        |
|    | Ala        | Asp<br>370 | Val        | Phe        | Met        | Val        | Pro<br>375 | Gln        | Tyr        | Gly        | Tyr        | Leu<br>380 | Thr        | Leu        | Asn        | Asn        |
| 35 | Gly<br>385 | Ser        | Gln        | Ala        | Leu        | 390<br>Gly | Arg        | Ser        | Ser        | Phe        | Tyr<br>395 | Суз        | Leu        | Glu        | Tyr        | Phe<br>400 |
| 40 | Pro        | Ser        | Gln        | Met        | Leu<br>405 | Arg        | Thr        | Gly        | Asn        | Asn<br>410 | Phe        | Gln        | Phe        | Ser        | Tyr<br>415 | Thr        |
|    | Phe        | Glu        | qeA        | Val<br>420 | Pro        | Phe        | His        | Ser        | Ser<br>425 | Tyr        | Ala        | His        | Ser        | Gln<br>430 | Ser        | Leu        |
| 45 | Asp        | Arg        | Leu<br>435 | Met        | Asn        | Pro        | Leu        | Ile<br>440 | Asp        | Gln        | Tyr        | Leu        | Tyr<br>445 | Tyr        | Leu        | Val        |
| 50 | Arg        | Thr<br>450 | Gln        | Thr        | Thr        | Gly        | Thr<br>455 | СĺУ        | Gly        | Thr        | Gln        | Thr<br>460 | Leu        | Ala        | Phe        | Ser        |
|    | Gln<br>465 | Ala        | Gly        | Pro        | Ser        | Ser<br>470 | Met        | Ala        | Asn        | Gln        | Ala<br>475 | Arg        | Asn        | Trp        | Val        | Pro<br>480 |
| 55 |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |

|    |   | G1         | y Pr         | о Су            | 's T\      | /r Ar<br>48  |              | .n Gl             | n Ar       | g Va       | 1 Se<br>49 |                   | r Th       | r Th         | r As       | n Gl<br>49   |              |
|----|---|------------|--------------|-----------------|------------|--------------|--------------|-------------------|------------|------------|------------|-------------------|------------|--------------|------------|--------------|--------------|
| 5  |   | A.s        | n As         | n Se            | r As<br>50 | n Ph         | e Al         | a Tr              | p Th       | r G1<br>50 |            | a Al              | a Ly       | 's Ph        | e Ly<br>51 | s Le<br>.0   | u As:        |
| 10 |   | Gl         | y Ar         | g As<br>51      | p Se<br>5  | r Le         | u Me         | t As              | n Pr<br>52 | 6 Gl<br>0  | y Va       | l Al              | a Me       | t Al<br>52   |            | r Hi         | s Ly:        |
|    |   | As         | p Ası<br>530 | As <sub>i</sub> | p As       | p Ar         | g Ph         | e Ph<br>53        | e Pro<br>5 | o Se       | r Se       | r Gl              | y Va<br>54 |              | u 'Il      | e Ph         | e Gly        |
| 15 |   | Ly:<br>54: | s Glr<br>5   | . Gl            | y Al       | a Gl         | y Ası<br>550 | n As <sub>]</sub> | p Gl       | y Va       | l As       | р Ту.<br>55       |            | r Gl:        | n Va       | l Le         | 1 Ile<br>560 |
| 20 |   | Th         | : Asp        | Gl:             | ı Glı      | u Gl:<br>565 | ı Ile        | e Ly:             | s Ala      | Th         | 570        | n Pro             | Va.        | l Ala        | a Th       | r Glu<br>575 |              |
|    |   | Туг        | : Gly        | Ale             | Va.<br>580 | L Ala        | Ile          | e Asr             | a Asn      | Glr<br>585 |            | a Ala             | Asz        | Th:          | Gl:<br>590 | a Ala        | Gln          |
| 25 | ٠ | Thr        | Gly          | Leu<br>595      | Val        | . His        | Asn          | Gln               | Gly<br>600 | Val        | . Ile      | e Pro             | el?        | / Met<br>605 | Va]        | Trp          | Gln          |
| 30 |   | Asn        | Arg<br>610   | Asp             | Val        | . Tyr        | Leu          | Gln<br>615        | Gly        | Pro        | Ile        | Trp               | Ala<br>620 |              | Ile        | Pro          | His          |
|    |   | Thr<br>625 | Asp          | Gly             | Asn        | Phe          | His<br>630   | Pro               | Ser        | Pro        | Leu        | Met<br>635        | Gly        | Gly          | Phe        | Gly          | Leu<br>640   |
| 35 |   | Lys        | His          | Pro             | Pro        | Pro<br>645   | Gln          | Ile               | Leu        | Ile        | Lys<br>650 | Asn               | Thr        | Pro          | Val        | Pro<br>655   | Ala          |
| 40 |   | qeA        | Pro          | Pro             | Leu<br>660 | Thr          | Phe          | neA               | Gln        | Ala<br>665 | Lys        | Leu               | neA        | Ser          | Phe<br>670 | Ile          | Thr          |
|    |   | Gln        | Tyr          | Ser<br>675      | Thr        | Gly          | Gln          | Val               | Ser<br>680 | Val        | Glu        | Ile               | Glu        | Trp<br>685   | Glu        | Leu          | Gln          |
| 45 |   | Lys        | Glu<br>690   | Asn             | Ser        | Гуз          | Arg          | Trp<br>695        | Asn        | Pro        | Glu        | Ile               | Gln<br>700 | Tyr          | Thr        | Ser          | Asn          |
| 50 |   | Tyr<br>705 | Tyr          | Lys             | Ser        | Thr          | Asn<br>710   | Val               | Asp        | Phe        | Ala        | <b>Val</b><br>715 | Asn        | Thr          | Glu        | Gly          | Val<br>720   |
|    | ٠ | Tyr        | Ser          | Glu             | Pro        | Arg<br>725   | Pro          | Ile               | Gly        | Thr        | Arg<br>730 | Tyr               | Leu        | Thr          | Arg        | Asn<br>735   | Leu          |
| 55 |   |            |              |                 |            |              |              |                   |            |            |            |                   |            |              |            |              |              |

<210> 97 <211> 736

<212> PRT <213> capsid protein of AAV serotype, clone 43.25

<400> 97

5

|    |   | Me<br>1    | et Al       | a Al       | a As       | p Gl<br>5 | у ту         | ' <sup>r</sup> Le | u Pr       | :o As      | sp Tr<br>10 | p Le         | u Gl      | u As        | p As       | n Le | eu Ser            |
|----|---|------------|-------------|------------|------------|-----------|--------------|-------------------|------------|------------|-------------|--------------|-----------|-------------|------------|------|-------------------|
| 10 |   | G1         | .u .G1      | y Il       | e Ar<br>20 | g Gl      | u Tr         | p Tr              | eA q       | p Le<br>25 | u Ly        | s Pr         | o Gl      | y Al        | a Pr<br>30 |      | 's Pro            |
| 15 |   | Ly         | s Al        | a As<br>35 | n Gli      | a Gli     | n Ly         | s Gl              | n As<br>40 | eA q       | p Gl        | y Ar         | g Gl      | y Lei<br>45 | u Va       | l Le | u Pro             |
|    |   | G1         | у Ту.<br>50 | r Ly:      | э Туг      | Let       | ı Gl         | y Pro             | o Ph       | e Ası      | n Gl        | y Le         | Ası<br>60 | Lys         | Gl:        | y Gl | u Pro             |
| 20 |   | Va:<br>65  | l Ası       | n Ale      | a Ala      | Asp       | 70           | a Ala             | a Ala      | a Le       | ı Glı       | His<br>75    | Asp       | Lys         | a Ala      | а ту | r Asp<br>80       |
| 25 |   |            |             |            |            | 63        |              |                   |            |            | 90          |              |           |             |            | 95   | 3 Ala             |
|    |   | •          |             |            | 100        |           |              |                   |            | 105        | •           |              |           |             | 110        |      | , el <sup>a</sup> |
| 30 |   |            |             | 110        |            |           |              |                   | 120        |            |             |              |           | 125         |            |      | Pro               |
| 35 |   |            |             |            | Val        |           |              | 135               |            |            |             |              | 140       |             |            |      |                   |
|    |   |            |             |            | Gln        |           | . 130        |                   |            |            |             | 155          |           |             |            |      | 160               |
| 40 |   |            |             |            | Gln        | 163       |              |                   |            |            | 170         |              |           |             |            | 175  |                   |
| 45 |   |            | ٠           |            | Glu<br>180 |           |              |                   |            | 185        |             |              |           |             | 190        |      |                   |
|    |   |            |             | 1,,        | Ser        |           | •            |                   | 200        |            |             |              |           | 205         |            |      |                   |
| 50 | , | Ala        | Pro<br>210  | Met        | Ala 1      | qeA       | Asn .        | Asn<br>215        | Glu        | Gly .      | Ala .       | Aap (        | Gly '     | Val         | Gly        | Asn  | Ser               |
|    |   | Ser<br>225 | Gly         | Asn        | Trp 1      | His (     | Cys .<br>230 | Asp :             | Ser '      | Thr '      | Trp         | Leu (<br>235 | 3ly 2     | Asp 1       | Arg        |      | Ile<br>240        |

|    |    | Thr               | Thr        | : Sei      | The        | 245        |            | Trp        | Ala        | Lev        | 250        |            | туг        | Asn        | Asn        | His<br>255 | Leu        |   | •• |    |
|----|----|-------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|---|----|----|
| 5  |    | Tyr               | Lys        | Glr        | 1le<br>260 |            | Asn        | Gly        | Thr        | Ser<br>265 |            | , el?      | / Ser      | Thr        | Asn<br>270 |            | Asn        |   |    | •  |
| 10 | ۶. | Thr               | туг        | Phe 275    |            | Tyr        | Ser        | Thr        | Pro<br>280 | _          | Gly        | · Tyr      | : Phe      | Asp<br>285 |            | Asn        | Arg        |   |    |    |
| 45 |    | Phe               | His<br>290 |            | His        | 2he        | Ser        | Pro<br>295 | -          | Asp        | Trp        | Gln        | Arg<br>300 |            | Ile        | Asn        | Asn        |   |    |    |
| 15 |    | Asn<br>305        |            | Gly        | Phe        | Arg        | Pro<br>310 | _          | Arg        | Leu        | Asn        | Phe<br>315 | _          | Leu        | Phe        | neA        | Ile<br>320 | • |    |    |
| 20 |    | Gln               | Val        | Lys        | Glu        | Val<br>325 | Thr        | Thr        | Asn        | Glu        | Gly<br>330 |            | Lys        | Thr        | Ile        | Ala<br>335 | Asn        |   | :  | ٠. |
| 25 |    | Asn               | Leu        | Thr        | Ser<br>340 | Thr        | Val        | Gln        | Val        | Phe<br>345 | Thr        | Asp        | Ser        | Glu        | Tyr<br>350 | Gln        | Leu        |   |    |    |
|    |    | Pro               | Tyr        | Val<br>355 |            | Gly        | Ser        | Ala        | His<br>360 | Gln        | eJy        | Суз        | Leu        | Pro<br>365 | Pro        | Phe        | Pro        | • |    |    |
| 30 |    | Ala               | Asp<br>370 |            | Phe        | Met        | Val        | Pro<br>375 | Gln        | Tyr        | вĵу        | Tyr        | Leu<br>380 | Thr        | Leu        | Asn        | Asn        |   |    |    |
| 35 |    | Gly<br>385        |            | Gln        | Ala        | Leu        | 390        | Arg        | Ser        | Ser        | Phe        | Tyr<br>395 |            | Leu        | Glu        | Туг        | Phe<br>400 |   |    |    |
|    |    | Pro               | Ser        | Gln        | Met        | Leu<br>405 | Arg        | Thr        | Gly        | Asn        | Asn<br>410 | Phe        | Gln        | Phe        | Ser        | Tyr<br>415 | Thr        |   |    |    |
| 40 |    | Phe               | Glu        | Asp        | Val<br>420 | Pro        | Phe        | His        | Ser        | Ser<br>425 | Tyr        | Ala        | His        | Ser        | Gln<br>430 |            | Leu-       |   |    | ٠  |
| 45 |    | Asp               | Arg        | Leu<br>435 | Met        | Asn        | Pro        | Leu        | Ile<br>440 | Asp        | Gļn        | Tyr        | Leu        | Tyr<br>445 | Tyr        | Leu        | Val        |   | į  |    |
|    |    | Arg               | Thr<br>450 | Gln        | Thr        | Thr        | Gly        | Thr<br>455 | Gly        | Gly        | Thr        | Gln        | Thr<br>460 | Leu        | Ala        | Phe        | Ser        |   |    |    |
| 50 |    | <b>Gln</b><br>465 | Ala        | ejà        | Pro        | Ser        | Ser<br>470 | Met        | Ala        | Asn        | Gln        | Ala<br>475 | Arg        | neA        | Trp        |            | Pro<br>480 |   |    |    |
| 56 |    | Gly               | Pro        | Cys        | Tyr        | Arg<br>485 | Gln        | Gln        | Arg        | Val        | Ser<br>490 | Thr        | Thr        | Thr        | Asn        | Gln<br>495 | Asn        |   |    |    |

| _          |                    | A.         | on A       | sn S         | er A<br>5  | oo<br>Oo    | he A        | la T        | rp 1       | hr       | Gly<br>505 | / Al              | a Aļ         | a L                | ys P       |            | ys 1<br>510 | Leu      | As         |
|------------|--------------------|------------|------------|--------------|------------|-------------|-------------|-------------|------------|----------|------------|-------------------|--------------|--------------------|------------|------------|-------------|----------|------------|
| 5          |                    | G]         | ly Ai      | rg A:<br>5:  | sp S<br>15 | er L        | eu M        | et A        | sn p       | 20       | Gly        | Va:               | l Al         | a Me               | 5t A       | la s<br>25 | er F        | lis      | Lys        |
| 10         |                    | Αs         | P As<br>53 | sp As<br>10  | BP A       | sp A        | rg Pl       | he P:       | he P       | ro       | Ser        | Sei               | G1           | y Va<br>54         | l Le       | au I       | le P        | he       | Gly        |
| 15         |                    | Ly<br>54   | s Gl<br>5  | n Gl         | y A        | la Gl       | Ly As<br>55 | sn A.<br>50 | sp G       | ly '     | Val        | Ąsp               | ту:<br>555   | s Se               | r Gl       | n V        | al L        | eų       | Ile<br>560 |
| 15         |                    | Th         | r As       | p Gl         | u G]       | lu G1<br>56 | .u Il<br>5  | Le Ly       | /S A       | la 7     | Chr        | <b>Asn</b><br>570 | Pro          | Va                 | 1 Al       | a Tì       |             | lu<br>75 | Glu        |
| 20         |                    | Ty:        | r Gl       | y Al         | a Va<br>58 | l Al<br>O   | a Il        | e As        | n As       | n G<br>5 | 31n<br>85  | Ala               | Ala          | . Ası              | n Th       | r G]<br>59 | n A:        | la (     | Gln        |
| 25         |                    | Thi        | : Gl       | y Le:<br>59: | u Va<br>5  | l Hi        | s As        | n Gl        | n G1<br>60 | y V      | al         | Ile               | Pro          | Gl                 | Me1<br>60: | t Va<br>5  | ıl Tı       | np (     | Sln        |
| 23         |                    | Asn        | Arg<br>610 | Asp          | Va.        | l Ty:       | r Lei       | u G1:       | n Gl<br>5  | y P      | ro         | Ile               | Trp          | Ala<br>620         | Lys        | s Il       | e Pr        | o E      | lis        |
| 30         |                    | Thr<br>625 | Asp        | Gly          | Ası        | n Phe       | His<br>630  | Pro         | Se.        | r P:     | ro 1       | Leu               | Met<br>635   | Gly                | Gly        | Ph         | e Gl        |          | eu<br>40   |
| <b>3</b> 5 |                    | Lys        | His        | Pro          | Pro        | 645         | Glr         | ıle         | : Le       | ц II     | le 1       | Lys<br>550        | Asn          | Thr                | Pro        | Va.        | 1 Pr<br>65  |          | la         |
|            |                    | qeA        | Pro        | Pro          | Lev<br>660 | Thr         | Phe         | : Asn       | Glr        | 6 A J    | la I       | .ys               | Leu          | Asn                | Ser        | Phe<br>670 | e Il(       | e T      | hr         |
| 40         | • • •              | Gln        | Туг        | Ser<br>675   | Thr        | Gly         | Gln         | Val         | 9er<br>680 | Va       | l G        | lu :              | Ile          | Glu                | Trp<br>685 | Glu        | Let         | ı G      | ln         |
| 45         |                    | Lys        | Glu<br>690 | Asn          | Ser        | Lys         | Arg         | Trp<br>695  | Asn        | Pr       | o G        | lu 3              | Cle (        | <b>51</b> n<br>700 | Tyr        | Thr        | Ser         | : As     | 3n         |
| 70         |                    | Tyr<br>705 | Tyr        | Lys          | Ser        | Thr         | Asn<br>710  | Val         | Asp        | Ph       | e A        | la V<br>7         | /al /<br>/15 | Asn                | Thr        | Glu        | Gly         | Va<br>72 |            |
| <i>50</i>  |                    | Tyr        | Ser        | Glu          | Pro        | Arg<br>725  | Pro         | Ile         | eJÀ        | Thi      | r A:       | rg T<br>30        | yr I         | eu                 | Thr        | Arg        | Asn<br>735  | Le       | u          |
|            | •                  | _          |            |              |            |             |             |             |            |          |            |                   |              |                    |            |            |             |          |            |
| 55         | <210> 9<br><211> 7 |            |            |              |            |             |             |             |            |          |            |                   |              |                    |            |            |             |          |            |

<212> PRT

<213> capsid protein of AAV serotype, clone 43.23

<400> 98

55

| 5  |     | Me<br>1    | t Al        | a Ala      | a Ası       | 9 Gl;<br>5 | у Ту:      | r Let       | ı Pr       | o As <sub>i</sub> | P Tr       | p Lev      | . Gl        | u Asj       | p Ası      | n Le       | u Ser      |
|----|-----|------------|-------------|------------|-------------|------------|------------|-------------|------------|-------------------|------------|------------|-------------|-------------|------------|------------|------------|
|    |     | G1         | u Gl        | y Ile      | e Arq<br>20 | g Gli      | ı Tr       | Tr          | eA c       | Let<br>25         | ı Ly:      | s Pro      | <b>G1</b> ; | y Ala       | a Pro      | b Ly:      | s Pro      |
| 10 |     | Ĺys        | s Ala       | 35         | ı Glr       | Glr        | ı Ly:      | s Glr       | Asp<br>40  | geA c             | o Gly      | / Arg      | r Gl        | y Let<br>45 | ı Val      | L Lei      | l Pro      |
| 15 |     | Gl         | 7 Tyr<br>50 | : Lys      | Tyr         | Leu        | . el?      | / Pro<br>55 | Phe        | Asr               | a Gly      | Leu        | Asr<br>60   | Lys         | s Gly      | / Glu      | l Pro      |
|    |     | Val<br>65  | . Asn       | Ala        | . Ala       | Asp        | Ala<br>70  | Ala         | Ala        | Leu               | Glu        | His<br>75  | Asp         | Lys         | Ala        | Tyr        | Asp<br>80  |
| 20 |     | Gln        | Gln         | Leu        | Lys         | Ala<br>85  | Gly        | ' Asp       | Asn        | Pro               | Tyr<br>90  | Leu        | Arg         | Tyr         | Asn        | His<br>95  | Ala        |
| 25 |     | Asp        | Ala         | Glu        | Phe<br>100  | Gln        | Glu        | Arg         | Leu        | Gln<br>105        |            | Asp        | Thr         | Ser         | Phe<br>110 |            | GŢĀ        |
|    |     | Asn        | Leu         | Gly<br>115 | Arg         | Ala        | Val        | Phe         | Gln<br>120 | Ala               | Lys        | Lys        | Arg         | Val<br>125  | Leu        | Glu        | Pro        |
| 30 |     | Leu        | Gly<br>130  | Leu        | Val         | Glu        | Glu        | Gly<br>135  | Ala        | Lys               | Thr        | Ala        | Pro<br>140  | Gly         | Lys        | Lys        | Arg        |
| 35 |     | Pro<br>145 | Val         | Glu        | Gla         | Ser        | Pro<br>150 | Gln         | Glu        | Pro               | qeA        | Ser<br>155 | Ser         | Ser         | Gly        | Ile        | Gly<br>160 |
|    |     | Lys        | Thr         | Gly        | Gln         | Gln<br>165 | Pro        | Ala         | Lys        | Lys               | Arg<br>170 | Leu        | Asn         | Phe         | Gly        | Gln<br>175 | Thr        |
| 40 |     | Gly        | Asp         | Ser        | Glu<br>180  | Ser        | Val        | Pro         | qzA        | Pro<br>185        | Gln        | Pro        | Leu         | Gly         | Glu<br>190 | Pro        | Pro        |
| 45 |     | Ala        | Ala         | Pro<br>195 | Ser         | Gly        | Leu        | Gly         | Pro<br>200 | neA               | Thr        | Met        | Ala         | Ser<br>205  | Gly        | Gly        | Gly        |
|    |     | Ala        | Pro<br>210  | Met        | Ala         | Asp        | Asn        | Asn<br>215  | Glu        | Gly               | Ala        |            | Gly<br>220  | Val         | Gly        | Asn        | Ser        |
| 50 | • 1 | Ser<br>225 | Gly         | Asn        | Trp         | His        | Cys<br>230 | Asp         | Ser        | Thr               |            | Leu<br>235 | Gly         | Asp         | Arg        |            | Ile<br>240 |
|    |     |            |             |            |             |            |            |             |            |                   |            |            |             |             |            |            |            |

| 5  | • | Th         | r Th       | ır Se      | r Tn       | r A <i>r</i><br>24 | g Th       | ur Tr      | p Al       | a Le       | u Pr<br>25 |            | т Ту       | r As       | eA n       | n Hi<br>25 | s Leu<br>5 |
|----|---|------------|------------|------------|------------|--------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
|    |   | ту         | r Ly       | e Gl       | n Il<br>26 | e Se<br>O          | r As       | n Gl       | y Th       | r Se<br>26 | r Gl       | y Gl       | y Se       | r Th       | r As<br>27 |            | p Asn      |
| 10 |   | Th         | r Ty       | r Ph<br>27 | e Gl;<br>5 | у Ту.              | r Se       | r Th       | r Pr<br>28 | o Tr       | p Gl       | у Ту       | r Ph       | e As<br>28 |            | a As       | n Arg      |
| 15 |   | Pho        | e Hi<br>29 | s Су:<br>0 | s His      | Phe                | e Se       | r Pr<br>29 | o Arg      | J Asj      | o Tr       | o Gli      | n Ar       |            | u Ile      | e As       | n Asn      |
|    |   | As:        | n Tr       | p Gly      | y Phe      | Arg                | 31(        | b Lys      | a Arg      | Let        | i Asr      | 315        |            | Let        | ı Phe      | : Ası      | 320        |
| 20 |   | Glr        | Va:        | l Lys      | Glu        | Val<br>325         | Thi        | r Thi      | . Asr      | Glu        | 330        | Tha        | Lys        | נמד :      | : Ile      | Ala<br>335 | ASn        |
| 25 |   | Asn        | Let        | Thr        | Ser<br>340 | Thr                | Va)        | . Gln      | Val        | Phe<br>345 | Thr        | qeA :      | Leu        | Glu        | Tyr<br>350 |            | Leu        |
|    |   | Pro        | Tyr        | Val<br>355 | Leu        | ely                | Ser        | Ala        | His<br>360 | Gln        | Gly        | суз        | Leu        | Pro<br>365 |            | Phe        | Pro        |
| 30 |   | Ala        | Asp<br>370 | Val        | Phe        | Met                | Val        | Pro<br>375 | Gln        | Tyr        | Gly        | Tyr        | Leu<br>380 | Thr        | Leu        | Asn        | Asn        |
| 35 |   | Gly<br>385 | Ser        | Gln        | Ala        | Leu                | Gly<br>390 | Arg        | Ser        | Ser        | Phe        | Tyr<br>395 | Cys        | Leu        | Glu        | Tyr        | Phe<br>400 |
|    |   | Pro        | Ser        | Gln        | Met        | Pro<br>405         | Arg        | Thr        | Gly        | Asn        | Asn<br>410 | Phe        | Gln        | Phe        | Ser        | Tyr<br>415 | Thr        |
| 40 |   | Phe        | Glu        | qzA        | Val<br>420 | Pro                | Phe        | His        | ser        | Ser<br>425 | Tyr        | Ala        | His        | Ser        | Gln<br>430 | Ser        | Leu        |
| 45 |   | qeA        | Arg        | Leu<br>435 | Met        | Asn                | Pro        | Leu        | Ile<br>440 | qeA        | Gln        | Tyr        | Leu        | 445        | Tyr        |            | Val        |
|    | ¢ | Arg        | Thr<br>450 | Gln        | Thr        | Thr                | Gly        | Thr<br>455 | Gly        | Gly        | Thr        | Gln        | Thr<br>460 |            | Ala        |            | Ser        |
| 50 |   | Gln<br>465 | Ala        | Gly        | Pro .      | Ser                | Ser<br>470 | Met        | Ala        | Asn        | Gln .      | Ala<br>475 | Arg        | asA        | Trp        | Val        | Pro<br>480 |
| 55 | ( | Sly        | Pro        | Сув        | Tyr i      | Arg<br>485         | Gln        | Gln .      | Arg        | Val .      | Ser '      | Thr '      | Thr        | Thr        | Asn (      | Gln<br>495 | Asn        |

|    |          | Asr          | n Asr                | n Sei        | 500        | Ph€        | Ala        | a Trp      | Thi        | 50         | y Ale<br>5 | A Ala      | a Lys        | B Phe      | E Ly:<br>51( |            | u Asn        |
|----|----------|--------------|----------------------|--------------|------------|------------|------------|------------|------------|------------|------------|------------|--------------|------------|--------------|------------|--------------|
| 5  |          | G1?          | / Arg                | 7 Asp<br>515 | Ser        | : Leu      | Met        | t Asn      | 9rc<br>520 |            | y Val      | . Ala      | Met          | 31 Ala     |              | Hi:        | s Lys        |
| 10 |          | ĄsĄ          | де <i>А</i> •<br>082 | Asp          | , Asp      | Arg        | Phe        | Phe<br>535 | Pro        | Se         | s Ser      | Gl)        | / Val<br>540 |            | ılle         | e Phe      | e Gly        |
| 15 |          | Lys<br>· 545 | Gln                  | Gly          | Ala        | Gly        | Asr<br>550 |            | Gly        | va]        | . Asp      | Tyr<br>555 |              | Gln        | Val          | Let        | 1 Ile<br>560 |
|    |          | Thr          | Asp                  | Glu          | Glu        | Glu<br>565 | Ile        | : Lys      | Ala        | Thr        | 370        |            | Val          | Ala        | Thr          | 61u<br>575 | ı Glu        |
| 20 |          | Tyr          | Gly                  | Ala          | Val<br>580 | Ala        | Ile        | Asn        | Asn        | Gln<br>585 |            | Ala        | _Asn_        | Thr        | Gln<br>590   |            | Gln          |
| 25 |          | Thr          | Gly                  | Leu<br>595   | Val        | His        | Asn        | Gln        | Gly<br>600 | Val        | Ile        | Pro        | Gly          | Met<br>605 | Val          | Trp        | Gln          |
|    |          | Asn          | Arg<br>610           | Asp          | Val        | Tyr        | Leu        | Gln<br>615 | Gly        | Pro        | Ile        | Trp        | Ala<br>620   | Lys        | Ile          | Pro        | His          |
| 30 |          | Thr<br>625   | Asp                  | Gly          | Asn        | Phe        | His<br>630 | Pro        | Ser        | Pro        | Leu        | Met<br>635 | Gly          | Gly        | Phe          | Gly        | Leu<br>640   |
| 35 |          | Lys          | His                  | Pro          | Pro        | Pro<br>645 | Gln        | Ile        | Leu        | Ile        | Lys<br>650 | Asn        | Thr          | Pro        | Val          | Pro<br>655 |              |
|    |          |              |                      |              | 660        |            |            | Asn        |            | 665        |            |            |              |            | 670          |            |              |
| 40 |          | Gln          | Tyr                  | Ser<br>675   | Thr        | Gly        | Gln'       | Val        | Ser<br>680 | Val        | Glu        | Ile        | Glu          | Trp<br>685 | Glu          | Leu        | Gln          |
| 45 |          |              | 690                  |              |            |            |            | Trp<br>695 |            |            |            |            | 700          |            |              |            |              |
|    |          | 705          |                      |              |            |            | 710        | Val        |            |            |            | 715        |              | ,          |              | _          | 720          |
| 50 | •        | Tyr          | Ser                  | Glu          | Pro        | Arg<br>725 | Pro        | Ile        | Gly        | Thr        | Arg<br>730 | Tyr        | Leu          | Thr        | Arg          | Asn<br>735 | Leu          |
| 55 | <210> 99 |              |                      |              |            |            |            |            |            |            |            |            |              |            |              |            |              |

<212> PRT

<213> capsid protein of AAV serotype, clone 43.20

<400>99

| 5    | Met<br>1   | Ala        | Ala        | Asp        | 2<br>GIÀ   | Tyr        | Leu        | Pro        | Asp        | Trp<br>10  | Leu        | Glu        | Asp        | Asn        | 15         | ser        |
|------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| ,    | Glu        | Gly        | Ile        | Arg<br>20  | Glu        | Trp        | Trp        | qeA        | Leu<br>25  | Lys        | Pro        | Gly        | Ala        | Pro<br>30  | Lys        | Pro        |
| 10   | ГЛЗ        | Ala        | Asn<br>35  | Gln        | Gln        | Lys        | Gln        | Asp<br>40  | qeA        | Gly        | Arg        | Gly        | Leu<br>45  | Val        | Leu        | Pro        |
| . 15 | Gly        | Tyr<br>50  | Lys        | Tyr        | Leu        | Gly        | Pro<br>55  | Phe        | Asn        | Gly        | Leu        | Asp<br>60  | Lys        | ejà        | Glu        | Pro        |
|      | Val<br>65  | Asn        | Ala        | Ala        | Asp        | Ala<br>70  | Ala        | Ala        | Leu        | Glu        | His<br>75  | Asp        | Lys        | Ala        | Tyr        | Asp<br>80  |
| 20   | Gln        | Gln        | Leu        | Lys        | Ala<br>85  | Gly        | qeA        | Asn        | Pro        | Tyr<br>90  | Leu        | Arg        | Tyr        | Asn        | His<br>95  | Ala        |
| .25  | Asp        | Ala        | Glu        | Phe<br>100 | Gln        | Glu        | Arg        | Leu        | Gln<br>105 | Glu        | qeA        | Thr        | Ser        | Phe<br>110 | Gly        | GJĀ        |
|      | Asn        | Leu        | Gly<br>115 | Arg        | Ala        | Val        | Phe        | Gln<br>120 | Ala        | Lys        | Lys        | Arg        | Val<br>125 | Leu        | Glu        | Pro        |
| 30   | Leu        | Gly<br>130 | Leu        | Val        | Glu        | Glu        | Gly<br>135 | Ala        | Lys        | Thr        | Ala        | Pro<br>140 | Gly        | Lys        | Lys        | Arg        |
| 35   | Leu<br>145 | Val        | Glu        | Gln        | Ser        | Pro<br>150 | Gln        | Glu        | Pro        | Asp        | Ser<br>155 | Ser        | Ser        | Gly        | Ile        | Gly<br>160 |
|      | Lys        | Thr        | GЈУ        | Gln        | Gln<br>165 | Pro        | Ala        | Lys        | Lys        | Arg<br>170 | Leu        | Asn        | Phe        | Gly        | Gln<br>175 | Thr        |
| 40   | Gly        | Asp        | Ser        | Glu<br>180 | Ser        | Val        | Pro        | Asp        | Pro<br>185 | Gln        | Pro        | Leu        | Gly        | Glu<br>190 | Pro        | Pro        |
| 45   | Ala        | Ala        | Pro<br>195 | Ser        | Gly        | Leu        | Gly        | Pro<br>200 | neA        | Thr        | Met        | Ala        | Ser<br>205 | Gly        | Gly        | Gly        |
|      |            | Pro<br>210 | Met        | Ala        | qeA        | Asn        | Asn<br>215 | Glu        | Gly        | Ala        | Asp        | Gly<br>220 | Val        | Gly        | Asn        | Ser        |
| 50   | Ser<br>225 | Gly        | Asn        | Trp        | His        | Cys<br>230 | Asp        | Ser        | Thr        | Trp        | Leu<br>235 | Gly        | qeA        | Arg        | Val        | Ile<br>240 |
|      |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |

| 5  |   | Thi        | r Thi      | r Se       | Th:        | 245        | Thi        | Tr         | p Ala      | a Le       | 250        |            | Ty.        | r Asi      | reA n      | n Hi:<br>25 | s Leu<br>5 |
|----|---|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|-------------|------------|
|    |   | Туг        | : Ly:      | e Glr      | 11e<br>260 | e Ser      | : Asr      | Gly        | y Thi      | 2 65       | c Gly      | , Gl       | / Se:      | r Thi      | Asi<br>270 |             | neA o      |
| 10 | , | The        | туг        | 275        | Gly        | Tyr        | : Ser      | The        | 280        |            | o Gly      | туг        | Ph:        | 285        |            | e Ası       | Arg        |
|    |   | Phe        | His<br>290 | Cys        | His        | Phe        | Ser        | Pro<br>295 |            | Asp        | ) Trp      | Gln        | Arg<br>300 |            | lle        | : Asr       | Asn        |
| 15 |   | Asn<br>305 | Trp        | Gly        | Phe        | Arg        | Pro<br>310 | Lys        | Arg        | Leu        | neA ı      | Phe<br>315 |            | Leu        | Phe        | : Asn       | Ile<br>320 |
| 20 |   | Gln        | Val        | Lys        | Glu        | Val<br>325 |            | Thr        | Asn        | Glu        | Gly<br>330 | Thr        | Lys        | Thr        | Ile        | Ala<br>335  | Asn        |
|    |   | Asn        | Leu        | Thr        | Ser<br>340 | Thr        | Val        | Gln        | Val        | Phe<br>345 |            | Asp        | Ser        | Glu        | Tyr<br>350 |             | Leu        |
| 25 |   | Pro        | Tyr        | Val<br>355 | Leu        | Gly        | Ser        | Ala        | His<br>360 | Gln        | Gly        | Cys        | Leu        | Pro<br>365 | Pro        | Phe         | Pro        |
| 30 |   | Ala        | Asp<br>370 | Val        | Phe        | Thr        | Val        | Pro<br>375 | Gln        | Tyr        | Gly        | Tyr        | Leu<br>380 | Thr        | Leu        | Asn         | Asn        |
|    |   | Gly<br>385 | Ser        | Gln        | Ala        | Leu        | 390<br>Gly | Arg        | Ser        | Ser        | Phe        | Tyr<br>395 | Суз        | Leu        | Glu        | Tyr         | Phe<br>400 |
| 35 |   | Pro        | Ser        | Gln        | Met        | Leu<br>405 | Arg        | Thr        | Gly        | Asn        | Asn<br>410 | Phe        | Gln        | Phe        | Ser        | Tyr<br>415  | Thr        |
| 40 |   | Phe        | Glu        | Asp        | Val<br>420 | Pro        | Phe        | His        | Ser        | Ser<br>425 | Tyr        | Ala        | His        | Ser        | Gln<br>430 | Ser         | Leu        |
|    |   | Asp        | Arg        | Leu<br>435 | Met        | Asn        | Pro        | Leu        | Ile<br>440 | qeA        | Gln        | Tyr        | Leu        | Tyr<br>445 | Tyr        | Leu         | Val        |
| 45 |   | Arg        | Thr<br>450 | Gln        | Thr        | Thr        | Gly        | Thr<br>455 | Gly        | GЉ         | Thr        | Gln        | Thr<br>460 | Leu        | Ala        | Phe         | Ser        |
| 50 |   | Gln<br>465 | Ala        | e13        | Pro        | Ser        | Ser<br>470 | Met        | Ala        | Asn        |            | Ala<br>475 | Arg        | Asn        | Trp        | Val         | Pro<br>480 |
|    | ٠ | GГÀ        | Pro        | Cys        |            | Arg<br>485 | Gln        | Gln        | Arg        |            | Ser<br>490 | Thr        | Thr        | Thr        | Asn        | Gln<br>495  | Asn        |
| 55 |   |            |            |            |            |            |            |            |            |            |            |            |            |            |            |             |            |

|           |                                              | Asn        | n RS n     | Ser        | 500        |            | Ala         | Tr         | Thr        | 61 <sub>3</sub><br>505 |            | Ala                | Lys        | Phe        | Lys<br>510 |            | 1 Asn      |
|-----------|----------------------------------------------|------------|------------|------------|------------|------------|-------------|------------|------------|------------------------|------------|--------------------|------------|------------|------------|------------|------------|
| 5         |                                              | Gly        | Arg        | Asp<br>515 |            | Leu        | . Met       | : Asn      | 520        |                        | Val        | Ala                | . Met      | Ala<br>525 |            | His        | 3 Lys      |
| 10        |                                              | Asp        | Asp<br>530 | qeA        | qeA        | Arg        | Phe         | Phe<br>535 | Pro        | Ser                    | Ser        | Gly                | Val<br>540 |            | Ile        | Phe        | e Gly      |
| 15        |                                              | Lys<br>545 | Gln        | Gly        | Ala        | Gly        | Asn<br>550  |            | Gly        | Val                    | Asp        | <b>Ty</b> :<br>555 |            | Gln        | . Val      | Leu        | Ile<br>560 |
|           |                                              | Thr        | Asp        | Glu        | Glu        | Glu<br>565 | Ile         | Lys        | Ala        | Thr                    | Asn<br>570 |                    | Val        | Ala        | Thr        | Glu<br>575 | Glu        |
| 20        |                                              | Туг        | Gly        | Ala        | Val<br>580 | Ala        | <b>Il</b> e | Asn        | Asn        | Gln<br>585             |            | Ala                | Asn        | Thr        | Gln<br>590 |            | Gln        |
| 25        |                                              | Thr        | Gly        | Leu<br>595 | Val        | His        | Asn         | Gln        | 600        | Val                    | Ile        | Pro                | Gly        | Met<br>605 | Val        | Trp        | Gln        |
| 25        |                                              | Asn        | Arg<br>610 | Asp        | Val        | Tyr        | Leu         | Gln<br>615 | Gly        | Pro                    | Ile        | Trp                | Ala<br>620 | Lys        | Ile        | Pro        | His        |
| 30        |                                              | Thr<br>625 | Asp        | Gly        | Asn        | Phe        | His<br>630  | Pro        | Ser        | Pro                    | Leu        | Met<br>635         | GЈĀ        | еĵу        | Phe        | Gly        | Leu<br>640 |
| <i>35</i> |                                              | Lys        | His        | Pro        | Pro        | Pro<br>645 | Gln         | Ile        | Leu        | Ile                    | Lys<br>650 | neA                | Thr        | Pro        | Val        | Pro<br>65S | Ala        |
|           |                                              | Asp        | Pro        | Pro        | Leu<br>660 | Thr        | Phe         | Asn        | Gln        | Ala<br>665             | Lys        | Leu                | Asn        | Ser        | Phe<br>670 | Ile        |            |
| 40        |                                              | Gln        | Tyr        | Ser<br>675 | Thr        | Gly        | Gln         | Val        | Ser<br>680 | Val                    | Glu        | Ile                | Glu        | Trp<br>685 | Glu        | Leu        | Gln        |
| 45        |                                              | Lys        | Glu<br>690 | Asn        | Ser        | Lys        | Arg         | Trp<br>695 | Asn        | Pro                    | Glu        | Ile                | Gln<br>700 | Tyr        | Thr        | Ser        | Asn        |
|           |                                              | Tyr<br>705 | Tyr        | Lys        | Ser        | Thr        | Asn<br>710  | Val        | qeA        | Phe                    | Ala        | Val<br>715         | aeA        | Thr        | Glu        | Gly        | Val<br>720 |
| 50        |                                              | Tyr        | Ser        | Glu        | Pro .      | Arg<br>725 | Pro         | Ile        | Gly        |                        | Arg<br>730 | Tyr                | Leu        | Thr        | Arg        | Asn<br>735 | Leu        |
| 55        | <210> 10<br><211> 73<br><212> PF<br><213> ca | 6<br>RT    | otein c    | of AA\     | / sero     | type, d    | cione .     | AAV9       |            |                        |            |                    |            |            |            |            |            |
|           | 400> 100                                     |            |            |            |            |            |             |            |            |                        |            |                    |            |            |            |            |            |

|    | Me t       | : Ala      | a Ala      | le <i>A</i> | 61)<br>5   | Ty:             | r Lei      | ı Pro      | eA o       | Tr<br>10   | ) Let      | ı Glı      | ı Ası       | Ası        | n Lei<br>15 | ı Ser      |
|----|------------|------------|------------|-------------|------------|-----------------|------------|------------|------------|------------|------------|------------|-------------|------------|-------------|------------|
| 5  | etr        | Gly        | / Ile      | 20          | g Glu      | Tr              | o Tzj      | geA o      | Lev<br>25  | 1 Lys      | Pro        | Gly        | Ala         | 30         | Ly:         | Pro        |
| 10 | Lya        | Ala        | Asn<br>35  | Glr         | . Glr      | Ly              | s Glr      | 40.        | Asp        | , elã      | ' Arg      | eJ?        | / Let<br>45 | ı Val      | Lev         | Pro        |
|    | Gly        | Tyz<br>50  | : Lys      | Tyr         | Leu        | Gl <sub>y</sub> | Pro<br>55  | Phe        | neA :      | Gly        | Leu        | Asp<br>60  | ) Lys       | . Gly      | Glu         | Pro        |
| 15 | Val<br>65  | Asn        | Ala        | Ala.        | qeA ·      | Ala<br>70       | Ala        | Ala        | Leu        | Glu        | His<br>75  | Asp        | Lys         | Ala        | Tyr         | qeA<br>08  |
| 20 | Gln        | Gln        | Leu        | Lys         | Ala<br>85  | Gly             | ' Asp      | Asn        | Pro        | Tyr<br>90  | Leu        | Arg        | Tyr         | ' Asn      | His<br>95   | Ala        |
|    | Asp        | Ala        | Glu        | Phe<br>100  | Gln        | Glu             | Arg        | Гел        | Gln<br>105 |            | qaA        | Thr        | Ser         | Phe<br>110 |             | Gly        |
| 25 | Asn        | Leu        | Gly<br>115 | Arg         | Ala        | Val             | Phe        | Gln<br>120 | Äla        | Lys        | Lys        | Arg        | Val<br>125  | Leu        | Glu         | Pro        |
| 30 | Leu        | Gly<br>130 | Leu        | Val         | Glu        | Glu             | Gly<br>135 | Ala        | Lys<br>    | Thr        | Ala        | Pro<br>140 | Gly         | Lys        | Lys         | Arg        |
|    | Pro<br>145 | Val        | Glu        | Gln         | Ser        | Pro<br>150      | Gln        | Glu        | Pro        | Asp        | Ser<br>155 | Ser        | Ser         | Gly        | Ile         | Gly<br>160 |
| 35 | Lys        | Ser        | Gly        | Gln         | Gln<br>165 | Pro             | Ala        | Lys        | Lys        | Arg<br>170 | Leu        | Asn        | Phe         | Gly        | Gln<br>175  | Thr        |
| 40 | Gly        | Ąsp        | Ser        | Glu<br>180  | Ser        | Val             | Pro        | Asp        | Pro<br>185 | Gln        | Pro        | Leu        | Gly         | Glu<br>190 | Pro         | Pro        |
|    | Glu        | Ala        | Pro<br>195 | ser         | Gly        | Leu             | Gly        | Pro<br>200 | neA        | Thr        | Met        | BLA        | Ser<br>205  | Gly        | Gly         | Gly        |
| 45 | Ala        | Pro<br>210 | Met        | Ala         | Asp        | Asn             | Asn<br>215 | Glu        | Gly        | Ala        | Asp        | Gly<br>220 | Val         | Gly        | Asn         | Ser        |
| 50 | Ser<br>225 | Gly        | Asn        | Trp         | His        | Cys<br>230      | Asp        | Ser        | Thr        |            | Leu<br>235 | Gly        | Asp         | AIg        |             | Ile<br>240 |
|    | Thr        | Thr        | Ser        | Thr         | Arg<br>245 | Thr             | Trp        | Ala        |            | Pro<br>250 | Thr        | Tyr        | Asn         | Asn        | His<br>255  | Leu        |
|    |            |            |            |             |            |                 |            |            |            |            |            |            |             |            |             |            |

| 5  | Ty:        | r Ly:      | s Glr      | 260        |              | r Ası      | n Gly      | y Th       | r Se.<br>26 |            | y Gl       | y Se       | c Thi      | 270          |            | p Asn      |
|----|------------|------------|------------|------------|--------------|------------|------------|------------|-------------|------------|------------|------------|------------|--------------|------------|------------|
|    | Thi        | г Ту       | 27.5       | e Gly      | Tyz          | s Se       | t Thi      | 280        |             | p Gl       | / Ty       | Phe        | 285        |              | e Ası      | n Arg      |
| 10 | Ph€        | 290        | Cys        | His        | Phe          | Se:        | 295        |            | ley i       | Tr         | Glr        | 300        |            | lle          | . Ası      | asA a      |
| 15 | Asn<br>305 | Trp        | GJY        | Phe        | Arg          | 9rc<br>310 | Lys        | Arg        | , Lev       | neA i      | 315        |            | Leu        | Phe          | Ası        | 320        |
|    | Gln        | Val        | Lys        | eln        | Val<br>325   | Thr        | Thr        | Asn        | Glu         | Gly<br>330 |            | Lys        | Thr        | Ile          | Ala<br>335 | Asn        |
| 20 | Asn        | Leu        | Thr        | Ser<br>340 | Thr          | Val        | Gln        | Val        | Phe<br>345  |            | Asp        | Ser        | Glü        | Tyr<br>350   | Gln        | Leu        |
| 25 | Pro        | Tyr        | Val<br>355 | Leu        | Gly          | Ser        | Ala        | His<br>360 |             | Gly        | Cys        | Leu        | Pro<br>365 | Pro          | Phe        | Pro        |
|    | Ala        | Asp<br>370 | Val        | Phe        | Met          | Val        | Pro<br>375 | Gln        | Tyr         | Gly        | Tyr        | Leu<br>380 | Thr        | Leu          | asa        | Asn        |
| 30 | Gly<br>385 | Ser        | Gln        | Ala        | Leu          | 390        | Arg        | Ser        | Ser         | Phe        | Tyr<br>395 | Cys        | Leu        | Glu          | Tyr        | Phe<br>400 |
| 35 | Pro        | Ser        | Gln        | Met        | Leu<br>405   | Arg        | Thr        | Gly        | Asn         | Asn<br>410 | Phe        | Gln        | Phe        | Ser          | Tyr<br>415 | Thr        |
|    | Phe        | Glu        | Asp        | Val<br>420 | Pro          | Phe        | His        | Ser        | Ser<br>425  | Tyr        | Ala        | His        | Ser        | Gln<br>430   | Ser        | Leu        |
| 40 | Asp        | Arg        | Leu<br>435 | Met        | Asn          | Pro        | Leu        | Ile<br>440 | Asp         | Gln        | Tyr        | Len        | Tyr<br>445 | Tyr          | Leu        | Val        |
| 45 | Arg        | Thr<br>450 | Gln        | Thr        | Thr          | Gly        | Thr<br>455 | Gly        | Gly         | Thr        | Gln        | Thr<br>460 | Leu        | Ala          | Phe        | Ser        |
|    | Gln<br>465 | Ala        | Gly        | Pro        | Ser          | Ser<br>470 | Met .      | Ala .      | Asn         |            | Ala<br>475 | Arg .      | Asn        | Trp          | Val        | Pro<br>480 |
| 50 | Gly        | Pro        | Cys        | Tyr :      | Arg  <br>485 | Gln        | Gln :      | Arg        |             | Ser<br>490 | Thr        | Thr        | Thr .      |              | Gln<br>495 | Asn        |
| 55 | Asn        | Asn        | Ser :      | Asn<br>500 | Phe ?        | Ala        | Trp '      |            | Gly<br>505  | Ala .      | Ala :      | Lys        |            | Lys :<br>510 | Leu .      | Asn        |

| 5        |                                             | G1;                  | y Ar           | 3 Asp<br>515 | 5 Sea      | r Lei      | ı Me       | t Ası        | 520         |            | y Vai      | l Ala      | a Met             | 52.        |            | r Hi         | s Lys        |
|----------|---------------------------------------------|----------------------|----------------|--------------|------------|------------|------------|--------------|-------------|------------|------------|------------|-------------------|------------|------------|--------------|--------------|
|          |                                             | Ası                  | 2 Asg<br>3 C C | o Glu        | ı Asp      | Arg        | g Phe      | 9 Phe<br>535 | e Pro       | Se         | r Se       | r Gly      | / Val             | L Lei      | u Ile      | e Ph         | e Gly        |
| 10       | ·                                           | Ly:<br>545           | s Glr          | Gly          | Ala        | Gly        | Asr<br>550 | n Asp        | Gly         | / Val      | ,<br>L Asy | Tyr<br>555 | Ser               | : Glr      | n Val      | L Le         | u Ile<br>560 |
| 15       | •                                           | The                  | : Asp          | elu          | Glu        | Glu<br>565 | Ile        | Lys          | Ala         | The        | 570        |            | Val               | Ale        | . Thr      | : Gl:<br>575 | ı Glu        |
|          |                                             | Tyr                  | : Gly          | Ala          | Val<br>580 | Ala        | Ile        | : Asn        | <b>A</b> en | Gln<br>585 | Ala        | Ala        | Asn               | Thr        | Gln<br>590 |              | Gln          |
| 20       |                                             | Thr                  | Gly            | Leu<br>595   | Val        | His        | Asn        | Gln          | Gly<br>600  | Val        | Ile        | Pro        | Gly               | Met<br>605 |            | Trp          | Gln          |
| 25       |                                             | aeA                  | Arg<br>610     | Asp          | Val        | Tyr        | Leu        | Gln<br>615   | Gly         | Pro        | Ile        | Trp        | Ala<br>620        | Lya        | Ile        | Pro          | His          |
|          |                                             | Thr<br>625           | Asp            | Gly          | Asn        | Phe        | His<br>630 | Pro          | Ser         | Pro        | Leu        | Met<br>635 | GJĀ               | ely        | Phe        | Gly          | Leu<br>640   |
| 30       |                                             | Lys                  | His            | Pro          | Pro        | Pro<br>645 | Gln        | Ile          | Leu         | Ile        | Lys<br>650 | Asn        | Thr               | Pro        | Val        | Pro<br>655   | Ala          |
| 35       |                                             | qeA                  | Pro            | Pro          | Leu<br>660 | Thr        | Phe        | Asn          | Gln         | Ala<br>665 | Lys        | Leu        | Asn               | Ser        | Phe<br>670 | Ile          | Thr          |
|          |                                             | Gln                  | Tyr            | Ser<br>675   | Thr        | GJA        | Gln        | Val          | Ser<br>680  | Val        | Glu        | Ile        | Glu               | Trp<br>685 | Glu        | Leu          | Gln          |
| 40       |                                             | Lys                  | Glu<br>690     | Asn          | Ser        | Lys        | Arg        | Trp<br>695   | Asn         | Pro        | Glu        |            | <b>Gln</b><br>700 | Tyr        | Thr        | Ser          | Asn          |
| 45       |                                             | Tyr<br>705           | Tyr            | Lys          | Ser        | Thr        | Asn<br>710 | Val          | Asp         | Phe        | Ala        | Val<br>715 | neA               | Thr        | Glu        | Gly          | Val<br>720   |
|          |                                             | Tyr                  | Ser            | Glu          | Pro        | Arg<br>725 | Pro        | Ile ·        | Gly '       |            | Arg<br>730 | Tyr        | Leu               | Thr        |            | Asn<br>735   | Leu          |
| 50<br>55 | <210> 10<br><211> 7;<br><212> P<br><213> ca | 28<br>RT<br>apsid pr | rotein         | of AA\       | / sero     | itype,     | clone      | 24.1         |             |            |            |            |                   |            |            |              |              |

Met Ala Ala Asp Gly Tyr Leu Pro Asp Trp Leu Glu Asp Asn Leu Ser 1 5 10 15

| 5  |   |    | Glu        | . Gly      | Ile                | Arg<br>20  | Glu        | Trp        | Trp        | Asp        | 25         | Lys        | Pro        | Gly        | Ala        | Pro<br>30  | Lys        | Pro        |  |
|----|---|----|------------|------------|--------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|--|
| v  |   |    | Lys        | : Ala      | Asn<br>35          | Gln        | . Gln      | Lys        | Gln        | A.ap<br>40 | Asp        | Gly        | / Arg      | Gly        | Leu<br>45  | Val        | Leu        | Pro        |  |
| 10 |   | ,  | Gly        | Ty:        | Lys                | Tyr        | Leu        | Arg        | Pro<br>55  | Phe        | Asn        | Gly        | Leu        | qέA<br>00  | Lys        | Gly        | Glu        | Pro        |  |
| 15 |   |    | Val<br>65  | Asn        | Glи                | Ala        | Asp        | Ala<br>70  | Ala        | Ala        | Leu        | Glu        | His<br>75  | Asp        | Lys        | Ala        | Tyr        | qeA<br>08  |  |
|    |   |    | Lys        | Gln        | Leu                | Glu        | Gln<br>85  | Gly        | qeA        | neA        | Pro        | Tyr<br>90  | Гел        | Lys        | Tyr        | Asn        | His<br>95  | Ala        |  |
| 20 |   |    | Asp        | Ala        | Glu                | Phe<br>100 | Gln        | Glu        | Arg        | Leu        | Gln<br>105 | Glu        | Asp        | Thr        | Ser        | Phe<br>110 | Gly        | Gly        |  |
| 25 |   | •• | Asn        | Leu        | Gly<br>115         | Arg        | Ala        | Val        | Phe        | Gln<br>120 | Ala        | Lys        | Lys        | Arg        | Val<br>125 | Leu        | Glu        | Pro        |  |
|    |   |    | Leu        | Gly<br>130 | Leu                | Val        | Glu        | Glu        | Val<br>135 | Ala        | Lys        | Thr        | Ala        | Pro<br>140 | Gly        | Lys        | Lys        | Arg        |  |
| 30 |   |    | Pro<br>145 | Ile        | Glu                | Ser        | Pro        | Asp<br>150 | Ser        | Ser        | Thr        | Gly        | Ile<br>155 | Gly        | Lys        | Lys        | Gly        | Gln<br>160 |  |
| 35 |   |    | Gln        | Pro        | Ala                | Lys        | Lys<br>165 | Lys        | Leu        | Asn        | Phe        | Gly<br>170 | Gln        | Thr        | Gly        | Asp        | Ser<br>175 | Glu        |  |
|    |   |    | Ser        | Val        | Pro                | Asp<br>180 | Pro        | Gln        | Pro        | Leu        | Gly<br>185 | Glu        | Pro        | Pro        | Ala        | Ala<br>190 | Pro        | Ser        |  |
| 40 |   |    | Gly        | Leu        | <i>G</i> ly<br>195 | Ser        | Gly        | Thr        | Met        | Ala<br>200 | Ala        | Gly        | Gly        | Gly        | Ala<br>205 | Pro        | Met        | Ala        |  |
| 45 |   |    | Asp        | Asn<br>210 | Asn                | Glu        | Gly        | Ala        | Asp<br>215 | Gly        | Val        | G1y        |            | Ala<br>220 | ser        | Gly        | Asn        | Trp        |  |
|    |   |    | His<br>225 | Cys        | Asp                | Ser        | Thr        | Trp<br>230 | Leu        | Gly        | Asp        | Arg        | Val<br>235 | Ile        | Thr        | Thr        | Ser        | Thr<br>240 |  |
| 50 |   |    | Arg        | Thr        | Trp                |            | Leu<br>245 | Pro        | Thr        | Tyr .      |            | Asn<br>250 | His        | Leu        | Tyr        | Lys        | Gln<br>255 | Ile        |  |
| 56 | , |    | Ser        | Ser        |                    | ser<br>260 | Gly        | Ala        | Thr .      |            | Азр<br>265 | Asn        | His        | Phe        | Phe        | Ser<br>270 | Tyr        | Ser        |  |

|    |   | Thr        | Pro        | 275        |            | Tyr        | Phe        | Asp        | 280        |             | Arg   | Phe        | His        | 285               |                  | Phe        | Ser        |
|----|---|------------|------------|------------|------------|------------|------------|------------|------------|-------------|-------|------------|------------|-------------------|------------------|------------|------------|
| 5  |   | Pro        | Arg<br>290 |            | Trp        | Gln        | . Arg      | Leu<br>295 |            | AST         | neA ı | neA.       | Trp<br>300 | Gly               | Phe              | Arg        | Pro        |
| 10 |   | Arg<br>305 | -          | Leu        | Arg        | Phe        | Lys<br>310 |            | . Phe      | Asn         | Ile   | Gln<br>315 |            | Lys               | <sup>'</sup> Glu | Val        | Thr<br>320 |
| 15 |   | Thr        | Asn        | Asp        | Gly        | Val<br>325 |            | Thr        | Ile        | Ala         | 330   |            | Leu        | Thr               | Ser              | Thr<br>335 | Ile        |
|    |   | Gln        | Val        | Phe        | Ser<br>340 |            | Ser        | Glu        | Tyr        | Gln<br>345  |       | Pro        | Tyr        | Val               | Leu<br>350       | Gly        | Ser        |
| 20 |   | Ala        | His        | Gln<br>355 | Gly        | Суз        | Leu        | Pro        | Pro<br>360 |             | Pro   | Ala        | Asp        | Val<br>365        | Phe              | Met        | Ile        |
| 25 |   |            | 370        | •          |            |            |            | 375        |            |             |       | ٠          | 380        | Gln               |                  |            |            |
|    |   | 385        |            |            | •          |            | 390        |            |            |             |       | 395        |            | Gln               |                  |            | 400        |
| 30 |   |            |            |            |            | 405        |            |            |            |             | 410   |            |            | Glu<br>_          |                  | 415        |            |
| 35 |   |            |            |            | 420        |            |            | •          |            | 425         |       | _          |            | Leu               | 430              |            |            |
|    |   |            |            | 435        |            |            |            | _          | 440        |             |       |            |            | Gln<br>445<br>Pro |                  |            |            |
| 40 |   |            | 4 50       |            |            |            |            | 455        |            |             |       |            | 4 60       | Tyr               |                  |            |            |
| 45 | · | 465        |            |            |            | -          | 470        | _          |            |             | -     | 475        | -          | Asn               |                  |            | 480        |
|    |   |            |            |            |            | 485        |            |            |            |             | 490   |            |            | Ser               |                  | 495        |            |
| 50 | · |            |            |            | 500        |            |            |            |            | 505         |       |            |            | Asp               | 510              |            |            |
| 55 |   | - • •      |            | 515        |            |            |            |            | 520        | - <b>4-</b> | &     | · •        |            | 525               |                  |            |            |

|    |                                  | Pro        | 11e<br>530 | Asn        | Gly        | Val        | Let        | Val<br>535 |            | Gl)        | , Lys      | Thr        | Gly<br>540 |            | Ala        | L A SI     | l Lys        |
|----|----------------------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|--------------|
| 5  |                                  | Thr<br>545 | Thr        | Leu        | Glu        | Asn        | Val<br>550 | Leu<br>)   | Met        | Thr        | : Ser      | Glu<br>555 |            | . Glu      | Ile        | : Ly:      | 5 Thr<br>560 |
| 10 |                                  | Thr        | Asn        | Pro        | Val        | Ala<br>565 |            | Glu        | Glu        | туг        | Gly<br>570 |            | Val        | Ser        | Ser        | Asr<br>575 | i Leu        |
|    |                                  | Gln        | Ser        | Ser        | Thr<br>580 |            | Gly        | Pro        | Gln        | Thr<br>585 |            | Thr        | Val        | Asn        | Ser<br>590 |            | Gly          |
| 15 |                                  | Ala        | Leu        | Pro<br>595 | G) y       | Met        | Val        | Trp        | Gln<br>600 | aeA        | Arg        | Asp        | Val        | Cys<br>605 | Leu        | . Gln      | ely          |
| 20 |                                  | Pro        | Ile<br>610 | Trp        | Ala        | Lys        | Ile        | Pro<br>615 | His        | Thr        | Asp        | Gly        | Asn<br>620 | Phe        | His        | Pro        | Ser          |
|    |                                  | Pro<br>625 | Leu        | Met        | Gly        | Gly        | Phe<br>630 |            | Leu        | Lys        | His        | Pro<br>635 | Pro        | Pro        | Gln        | Ile        | Leu<br>640   |
| 25 |                                  | Ile        | Lys        | Asn        | Thr        | Pro<br>645 | Val        | Pro        | Ala        | Asn        | Pro<br>650 | Pro        | Glu        | Val        | Phe        | Thr<br>655 | Pro          |
| 30 |                                  | Ala        | Lys        | Phe        | Ala<br>660 | Ser        | Phe        | Ile        | Thr        | Gln<br>665 | Туг        | ser        | Thr        | Gly        | Gln<br>670 | Val        | Ser          |
|    |                                  | Val        | Glu        | Ile<br>675 | Glu        | Trp        | Glu        | Leu        | Gln<br>680 | Lys        | Glu        | Asn        | Ser        | Lys<br>685 | Arg        | Trp        | Asn          |
| 35 |                                  | Pro        | 690        | Ile        | Gln        | Tyr        | Thr        | Ser<br>695 | Уsи        | Tyr        | Ala        | Lys        | Ser<br>700 | Asn        | Asn        | Val        | Glu          |
| 40 |                                  | Phe<br>705 | Ala        | Val        | Asn        | Asn        | Glu<br>710 | Gly        | Val        | Tyr        | Thr        | Glu<br>715 | Pro        | Arg        | Pro        | Ile        | Gly<br>720   |
|    |                                  | Thr        | Arg        | Tyr        | Leu        | Thr<br>725 | Arg        | Asn        | Leu        |            |            |            |            |            |            |            |              |
| 45 | <210> 10<br><211> 72<br><212> PF | 28         |            |            | :          |            |            |            |            |            |            |            |            |            |            |            |              |
| 50 | <213> ca                         | psid pr    | otein (    | of AA\     | √ serc     | type,      | clone      | 42.2R      | EAL        |            |            |            |            |            |            |            |              |
| 55 |                                  | Met .<br>1 | Ala        | Ala .      | Ąsp        | Gly<br>5   | Tyr        | Leu        | Pro        | qeA        | Trp<br>10  | Leu        | Glu        | qeA        | Asn        | Leu<br>15  | Ser          |

|    | Glu        | Gly        | Ile        | Arg<br>20  | Glu        | Trp        | Trp        | Asp        | Leu<br>25  | Lys        | Pro        | Gly        | Ala        | Pro<br>30  | Lys        | Pro              |
|----|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------------|
| 5  | Lys        | Ala        | Asn<br>35  | Gln        | Gln        | Lys        | Gln        | Asp<br>40  | qeA        | Gly        | Arg        | Gly        | Leu<br>45  | Val        | Leu        | Pro              |
| 10 | Gly        | Tyr<br>50  | Lys        | Tyr        | Leu        | Gly        | Pro<br>55  | Phe        | Asn        | Gly<br>,   | Leu        | Asp<br>00  | Lys        | Gly        | Glu        | Pro              |
| 15 | Val<br>65  | neA        | Glu        | Ala        | qeA        | Ala<br>70  | Ala        | Ala        | Leu        | Glu        | His<br>75  | qeA        | Lys        | Ala        | Tyr        | <b>Asp</b><br>08 |
|    | Lys        | Gln        | Leu        | Glu        | Gln<br>85  | Gly        | Asp        | Asn        | Pro        | Tyr<br>90  | Leu        | Lys        | Tyr        | neA        | His<br>95  | Ala              |
| 20 | qeA        | Ala        | Glu        | Phe<br>100 | Gln<br>:   | Glu        | Arg        | Leu        | Gln<br>105 | Glu        | Ąsp        | Thr        | Ser        | Phe<br>110 | Gly        | Gly              |
| 25 | Asn        | Leu        | Gly<br>115 | Arg        | Ala        | Val        | Phe        | Gln<br>120 | Ala        | Lys        | Lys        | Arg        | Val<br>125 | Leu        | Glu        | Pro              |
|    | Leu        | Gly<br>130 | Leu        | Val        | €]π        | Glu        | Gly<br>135 | Ala        | Lya        | Thr        | Ala        | Pro<br>140 | Gly        | Lys        | ГÀа        | Arg              |
| 30 | Pro<br>145 | Ile        | Glu        | Ser        | Pro        | Asp<br>150 | Ser        | Ser        | Thr        | Gly        | Ile<br>155 | Gly        | Lys        | Lys        | Gly        | Gln<br>160       |
| 35 | Gln        | Pro        | Ala        | Lys        | Lys<br>165 | Lys        | Leu        | Asn        | Phe        | Gly<br>170 | Gln        | Thr        | GŢĀ        | Asp        | Ser<br>175 | Glu              |
|    |            |            |            | 180        |            |            |            |            | 185        |            |            |            |            | 190        | Pro        |                  |
| 40 | Gly        | Leu        | Gly<br>195 | Ser        | Gly        | Thr        | Met        | Ala<br>200 | Ala        | Gly        | Gly        | Gly        | Ala<br>205 | Pro        | Met        | Ala              |
| 45 | -          | 210        |            |            | -          |            | 215        | -          |            | -          |            | 220        |            |            | nek        | -                |
|    | His<br>225 | Cys        | Asp        | Ser        | Thr        | Trp<br>230 | Leu        | Gly        | Asp        | Arg        | Val<br>235 | Ile        | Thr        | Thr        | Ser        | Thr<br>240       |
|    | 5          |            | •          |            | 245        |            |            | •          |            | 250        |            |            | -          | -          | Gln<br>255 |                  |
| 55 | Ser        | Ser        | Gln        | Ser<br>260 | Gly        | Ala        | Thr        | Asn        | Asp<br>265 | neA        | His        | Phe        | Phe        | G1y<br>270 | Tyr        | Ser              |

| 5  | Th:        | r Pro      | 275        |            | / Туз      | r Pho      | e Ası        | 280<br>280 |            | n Ari      | g Phe      | ∍ Hi:      | 28         |            | s Ph       | e Ser           |
|----|------------|------------|------------|------------|------------|------------|--------------|------------|------------|------------|------------|------------|------------|------------|------------|-----------------|
|    | Pr         | 290        |            | Tr         | Glr        | ı Arç      | g Let<br>295 |            | e Ası      | n Ası      | n Asi      | 300        |            | y Pbe      | e Ar       | g Pro           |
| 10 | Arq        |            | . Lev      | Arg        | Phe        | 310        |              | Phe        | e Ası      | n Ile      | Glr<br>315 |            | Ly         | s Glu      | va:        | )<br>Thr<br>320 |
| 15 | Thi        | Asn        | Asp        | Gly        | Val<br>325 |            | Thr          | : Ile      | Ala        | 330        |            | Leu        | Thi        | : Ser      | Th:<br>335 | : Ile           |
|    | Glr        | Val        | Phe        | Ser<br>340 |            | Ser        | : Glu        | Tyr        | Glr<br>345 |            | Pro        | Tyr        | Va]        | Leu<br>350 |            | , Ser           |
| 20 | Ala        | His        | Gln<br>355 |            | Cys        | Leu        | Pro          | Pro<br>360 |            | Pro        | Ala        | Asp        | Val<br>365 |            | Met        | : Ile           |
| 25 | Pro        | Gln<br>370 |            | Gly        | Tyr        | Leu        | Thr<br>375   |            | Asn        | Asn        | Gly        | Ser<br>380 |            | Ser        | Val        | Gly             |
|    | Arg<br>385 | Ser        | Ser        | Phe        | Tyr        | Cys<br>390 |              | Glu        | Tyr        | Phe        | Pro<br>395 | Ser        | Gln        | Met        | Leu        | Arg<br>400      |
| 30 | Thr        | e1A        | Asn        | Asn        | Phe<br>405 | Glu        | Phe          | Ser        | Tyr        | Thr<br>410 | Phe        | Glu        | G] n       | Val        | Pro<br>415 |                 |
| 35 | His        | Ser        | Ser        | Tyr<br>420 | Ala        | His        | Ser          | Gln        | Ser<br>425 | Leu        | qeA        | Arg        | Leu        | Met<br>430 | Asn        | Pro             |
|    | Leu        | Ile        | Asp<br>435 | Gln        | Tyr        | Leu        | Tyr          | Tyr<br>440 | Leu        | Ala        | Arg        | Thr        | Gln<br>445 | Ser        | Thr        | Thr             |
| 40 | Gly        | Ser<br>450 | Thr        | Arg        | Glu        | Leu        | Gln<br>455   | Ŗће        | His        | Gln        | Ala        | Gly<br>460 | Pro        | Asn        | Thr        | Met             |
| 45 | Ala<br>465 | Glu        | Gln        | Ser        | Lys        | Asn<br>470 | Trp          | Leu        | Pro        | Gly        | Pro<br>475 | Суэ        | Tyr        | Arg        | Gln        | Gln<br>480      |
|    | Arg        | Leu        | Ser        | ГÀа        | Asn<br>485 | lle        | qeA          | Ser        | Asn        | neA<br>190 | Asn        | Ser        | Asn        | Phe        | Ala<br>495 | Trp             |
| 50 | Thr        | Gly        |            | Thr<br>500 | Lys        | Tyr        | His          | Leu        | Asn<br>505 | Gly        | Arg        | Asn        | Ser        | Leu<br>510 | Thr        | Asn             |
| 55 | Pro        | Gly        | Val<br>515 | Ala        | Met        | Ala        | Thr          | Asn<br>520 | Lys        | Asp        | qeA        | Glu        | Asp<br>525 | Gln        | Phe        | Phe             |

| 5 .  |                           | Pro        | Ile<br>530 | Asn        | Gly        | Val        | Leu        | Val<br>535 | Phe        | Gly        | Glu        | Thr        | Gly<br>540 | Ala        | Ala        | Asn        | Lys        |
|------|---------------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
|      |                           | Thr<br>545 |            | Leu        | Glu        | Asn        | Val<br>550 | Leu        | Met        | Thr        | Ser        | Glu<br>555 | Glu<br>,   | Glu        | Ile        | ГÀЗ        | Thr<br>560 |
| 10   |                           | Thr        | Asn        | Pro        | Val        | Ala<br>565 | Thr        | Glu        | Glu        | Tyr        | Gly<br>570 | Val        | Val        | Ser        | Ser        | Asn<br>575 | Leu        |
| 15   |                           | Gln        | Ser        | Ser        | Thr<br>580 | Ala        | G] À       | Pro        | Gln        | Thr<br>585 | Gln        | Thr        | Val        | Asn        | Ser<br>590 | Gln        | Gly        |
|      |                           | Ala        | Leu        | Pro<br>595 | Gly        | Met        | Val        | Trp        | Gln<br>600 | Asn        | Arg        | Asp        | Val        | Tyr<br>605 | Leu        | Gln        | GJA        |
| 20   |                           | Pro        | Ile<br>610 | Trp        | Ala        | Lys        | Ile        | Pro<br>615 | His        | Thr        | Asp        | Gly        | Asn<br>620 | Phe        | His        | Pro        | Ser        |
| . 25 |                           | Pro<br>625 | Leu        | Met        | Gly        | Gly        | Phe<br>630 | eJy        | Leu        | Lys        | His        | Pro<br>635 | Pro        | Pro        | Gln        | Ile        | Leu<br>640 |
|      |                           | Ile        | Lys        | Asn        | Thr        | Pro<br>645 | Val        | Pro        | Ala        | Asn        | Pro<br>650 | Pro        | Glu        | Val        | Phe        | Thr<br>655 | Pro        |
| 30   |                           | Ala        | Lys        | Phe        | Ala<br>660 | Ser        | Phe        | Ile        | Thr        | Gln<br>665 | Tyr        | Ser        | Thr        | Gly        | Gln<br>670 | Val        | Ser        |
| 35   | ٠                         | Val        | Glu        | Ile<br>675 | Glu        | Trp        | Glu        | Leu        | Gln<br>680 | Lys        | Glu        | Asn        | ser        | Lys<br>685 | Arg        | Trp        | Asn        |
|      | 55 ·                      | Pro        | Glu<br>690 | Ile        | Gln        | Tyr        | Thr        | Ser<br>695 | Asn        | Tyr        | Ala        | ГÀЗ        | ser<br>700 | Asn        | neA        | Val        | Glu        |
| 40   |                           | Phe<br>705 | Ala        | Val        | Asn        | Asn        | Glu<br>710 | Gly        | Val        | Tyr        |            | Glu<br>715 | Pro        | Arg        | Pro        |            | Gly<br>720 |
| 45   |                           | Thr        | Arg        | Tyr        | Leu        | Thr<br>725 | Arg        | Asn        | Leu        |            |            |            |            |            |            |            |            |
| 50   | <210><211><211><212><213> | 728<br>PRT | proto:-    | of A       | ۸۱/ ۵۵-    | rotur-     | oler-      | . 7 0) 4   |            |            |            |            |            |            |            |            |            |
|      | <400>                     | capsid     | proteil    | I OI AV    | nv sei     | otype      | , cione    | : 1.2V     | <b>7</b> 1 |            |            |            |            |            |            |            |            |
|      | <b>~+UU&gt;</b>           | 103        |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |

|  |   |   | Tyr |   |   |   |   |  | Leu<br>15 | Ser |
|--|---|---|-----|---|---|---|---|--|-----------|-----|
|  | - | _ | Trp | _ | - | - | - |  | Lys       | Pro |

5

1 30

|     |    |       | гĀ         | s Ale       | 35         | n Gli      | n Gl       | n Lys      | s Gli      | 40         | p As       | b er       | / Arg             | g Gl       | y Let<br>45 | ı Va       | l Le       | ı Pro      |
|-----|----|-------|------------|-------------|------------|------------|------------|------------|------------|------------|------------|------------|-------------------|------------|-------------|------------|------------|------------|
|     | 5  |       | GJ 7       | 7 Ty:<br>50 | r Arç      | Ty:        | Le         | n ell      | 9 Pro      | Phe        | e.A. e     | n Gly      | 'Leu              | Asy<br>00  | Lys         | s Gly      | / Glu      | ı Pro      |
|     | 10 |       | Va]<br>65  | L Asr       | n Glu      | Ala        | Asp        | Ala<br>70  | Ala        | Ala        | Le:        | ı Glu      | His<br>75         | , Asp      | Lys         |            | Tyr        | qeA :      |
|     |    |       | Lys        | . Glr       | 1 Leu      | Glu        | Glr<br>85  | a Gly      | Asp        | Asn        | Pro        | 90         | Leu               | Lys        | туг         | : Asr      | His<br>95  | Ala        |
|     | 15 |       | Asp        | Ala         | Glu        | Phe<br>100 | Glr        | Glų        | Arg        | Leu        | Glr<br>105 |            | qeA               | Thr        | Ser         | Phe<br>110 |            | Gly        |
|     | 20 |       | Asn        | Leu         | Gly<br>115 | Arg        | Ala        | Val        | Phe        | Gln<br>120 |            | Lys        | Lys               | Arg        | Val<br>125  |            | Glu        | Pro        |
|     | 25 |       | Leu        | Gly<br>130  | Leu        | Val        | Glu        | Glu        | Gly<br>135 |            | Lys        | Thr        | Ala               | Pro<br>140 |             | Lys        | Lys        | Arg        |
|     | 23 | • ••• | Pro<br>145 | Ile         | Glu        | Ser        | Pro        | Asp<br>150 | Ser        | Ser        | Thr        | Gly        | Ile<br>155        | Gly        | Lys         | aeA        | Gly        | Gln<br>160 |
|     | 30 |       | Pro        | Pro         | Ala        | Lys        | Lys<br>165 | Lys        | Leu        | Asn        | Phe        | Gly<br>170 | Gln               | Thr        | Gly         | Asp        | Ser<br>175 | Glu        |
|     | 35 |       | Ser        | Val         | Pro        | Asp<br>180 | Pro        | Gln        | Pro        | Leu        | Gly<br>185 |            | Pro               | Pro        | Ala         | Ala<br>190 | Pro        | Ser        |
|     | 33 |       | Gly        | Leu         | Gly<br>195 | Ser        | Gly        | Thr        | Met        | Ala<br>200 | Ala        | Gly        | Gly               | Gly        | Ala<br>205  | Pro        | Met        | Ala        |
|     | 40 |       | Asp        | Asn<br>210  | Asn        | Glu        | Gly        | Ala        | Asp<br>215 | Gly        | Val        | Gly        | Asn               | Ala<br>220 | Ser         | Gly        | Asn        | Trp        |
|     | 45 |       | His<br>225 | Cys         | Asp        | Ser        | Thr        | Trp<br>230 | Leu        | Gly        | Asp        | Arg        | <b>Val</b><br>235 | Ile        | Thr         | Thr        | Ser        | Thr<br>240 |
|     | 45 |       | Azg        | Thr         | Trp        | Ala        | Leu<br>245 | Pro        | Thr        | Tyr        | Asn        | Asn<br>250 | His               | Leu        | Tyr         | Lys        | Gln<br>255 | Ile        |
|     | 50 |       | Ser        | Ser         | Gln        | Ser<br>260 | Gly        | Ala        | Thr        | neA        | Asp<br>265 | Asn        | His               | Phe        | Phe         | Gly<br>270 | Tyr        | Ser        |
|     | ££ |       | Thr        | Pro         | Trp<br>275 | Gly        | Tyr        | Phe        | Asp        | Phe<br>280 | Asn        | Arg        | Phe               | His        | Cys<br>285  | His        | Phe        | Ser        |
| . : |    |       |            |             |            |            |            |            |            |            |            |            |                   |            |             |            |            |            |

|    | Pr         | o Ar<br>29 | g As;<br>0 | p Tr       | e Gl         | n Ar         | 29:        | u Ile<br>5   | As:        | n Ası        | n Ası      | 30         |            | y Ph       | e Ar       | g Pro        |
|----|------------|------------|------------|------------|--------------|--------------|------------|--------------|------------|--------------|------------|------------|------------|------------|------------|--------------|
| 5  | Ar<br>30   | g Ly<br>S  | s Le       | u Arg      | g Pho        | e Ly:<br>31( | Let        | ı Phe        | Ası        | n Ile        | 315        |            | 1 Ly:      | s Gl       | u Va       | 1 Thr<br>320 |
| 10 | Th         | r Ası      | n Ası      | p Gly      | 7 Va.<br>325 | Th:          | Thi        | Ile          | Ala        | 330          | a Asr      | Le         | u Thi      | : Se       | r Th:      |              |
| 15 | Gli        | n Val      | l Phe      | 340        | Asp          | Ser          | Glu        | Tyr          | Glr<br>345 |              | Pro        | ту         | r Val      | Le:<br>35  |            | / Ser        |
|    | Ala        | A His      | 355        | Gly        | Cya          | Leu          | Pro        | Pro<br>360   |            | Pro          | Ala        | Asp        | Val<br>365 |            | e, Met     | : Ile        |
| 20 | Pro        | 370        | Туг        | Gly        | Tyr          | Leu          | Thr<br>375 | Leu          | Asn        | Asn          | Gly        | Ser<br>380 |            | Ser        | val        | Gly          |
| 25 | Arg<br>385 | Ser        | Ser        | Phe        | Tyr          | Cys<br>390   | Leu        | Glu          | Tyr        | Phe          | Pro<br>395 | Ser        | Gln        | Met        | : Leu      | Arg<br>400   |
|    | Thr        | Gly        | Asp        | Asn        | Phe<br>405   | Glu          | Phe        | Ser          | Tyr        | Thr<br>410   | Phe        | Glu        | Glu        | Val        | Pro<br>415 | Phe          |
| 30 | His        | Ser        | Ser        | Tyr<br>420 | Ala          | His          | Ser        | Gln          | Ser<br>425 | Leu          | Asp        | Arg        | Leu        | Met<br>430 |            | Pro          |
| 35 | Leu        | Ile        | Asp<br>435 | Gln        | Tyr          | Leu          | Tyr        | Tyr<br>440   | Leu        | Ala          | Arg        | Thr        | Gln<br>445 | Ser        | Thr        | Thr          |
|    | Gly        | Ser<br>450 | Thr        | Arg        | С∫п          | Leu          | Gln<br>455 | Phe          | His        | Gln          | Ala        | Gly<br>460 | Pro        | Asn        | Thr        | Met          |
| 40 | Ala<br>465 | Glu        | Gln        | Ser        | Lys          | Asn<br>470   | Trp        | Leu          | Pro        | Gly          | Pro<br>475 | Cys        | Tyr        | Arg        | Gln        | Gln<br>480   |
| 45 | Arg        | Leu        | Ser        | Lys        | Asn<br>485   | Ile          | qeA        | Ser          | Asn        | Asn .<br>490 | neA        | Ser        | Asn        | Phe        | Ala<br>495 | Trp          |
|    | Thr        | Gly        | Ala        | Thr<br>500 | Lys          | Tyr          | His        |              | Asn<br>505 | Gly .        | Arg .      | Asn        | Ser        | Leu<br>510 | Thr        | Asn          |
| 50 | Pro        | Gly        | Val<br>515 | Ala        | Met          | Ala          |            | Asn :<br>520 | Lys        | Asp .        | Asp ·      | Glu        | Asp<br>525 | Gln        | Phe        | Phe          |
| 55 | Pro        | Ile<br>530 | Asn        | Gly '      | Val          | Leu '        | Val :      | Phe (        | Gly :      | Lys :        |            | 51y<br>540 | Ala .      | Ala        | Asn        | Lys          |

| 5         |                                                 | Th:<br>545 | r Th:      | r Le       | u Glu       | Asr        | 550        | l Lei          | ı Me        | t Thi       | Se Se s     | 55:               |            | ı Gl       | u Ile      | e Ly:           | 560        |
|-----------|-------------------------------------------------|------------|------------|------------|-------------|------------|------------|----------------|-------------|-------------|-------------|-------------------|------------|------------|------------|-----------------|------------|
| Ū         |                                                 | Thi        | c Asr      | n Pr       | o Val       | Ala<br>565 | Thi        | Glu            | Glu         | ı Tyr       | Gly<br>570  |                   | l Val      | l Se       | r Sei      | 575             | Leu        |
| 10        |                                                 | Glr        | s Ser      | : Se       | Thr<br>580  | Ala        | Gly        | Pro            | Glr         | Thr<br>585  | Gln         | Thr               | : Val      | . Ası      | 590        |                 | Gly        |
| 15        |                                                 | Ala        | Leu        | 9rc<br>595 | Gly         | Met        | Val        | Trp            | <b>Gl</b> n | Asn         | Arg         | Asp               | Val        | Tyr<br>605 |            | Gl <sub>n</sub> | Gly        |
|           |                                                 | Pro        | Ile<br>610 | Trp        | Ala         | Lys        | Ile        | Pro<br>615     | His         | Thr         | Asp         | Gly               | Asn<br>620 |            | His        | Pro             | Ser        |
| 20        |                                                 | Pro<br>625 | Leu        | Met        | Gly         | Gly        | Phe<br>630 | Gly            | Leu         | Lys         | His         | Pro<br>635        | Pro        | Pro        | Gln        | Ile             | Leu<br>640 |
| <i>25</i> |                                                 | Ile        | Lys        | Asn        | Thr         | Pro<br>645 | Val        | Pro            | Ala         | Asn         | Pro<br>650  | Pro               | Glu        | Val        | Phe        | Thr<br>655      | Pro        |
|           |                                                 | Ala        | Lys        | Phe        | Ala<br>660  | Ser        | Phe        | Ile            | Thr         | Gln<br>665  | Tyr         | Ser               | Thr        | Gly        | Gln<br>670 | Val             | Ser        |
| 30        |                                                 | Val        | Glu        | Ile<br>675 | Glu         | Trp        | Glu        | Leu            | Gln<br>680  | Lys         | Glu         | Asn               | Ser        | Lys<br>685 | Arg        | Trp             | Asn        |
| <i>35</i> |                                                 | Pro        | Glu<br>690 | Ile        | Gln         | Tyr        | Thr        | Ser<br>695     | Asn         | Tyr         | Ala         | Lys               | Ser<br>700 | Asn        | Asn        | Val             | Glu        |
| •         |                                                 | Phe<br>705 | Ala        | Val        | Asn         | Asn        | Glu<br>710 | ely            | Val         | Tyr         | Thr         | <b>Glu</b><br>715 | Pro        | Arg        | Pro        | Ile             | Gly<br>720 |
| 40        |                                                 | Thr        | Arg        | Tyr        | Leu         | Thr :      | Arg .      | Asn            | Leu         |             |             |                   |            |            |            |                 |            |
| 45        | <210> 104<br><211> 724<br><212> PR<br><213> cap | B<br>!T    | otein (    | of AA      | V sero      | type, d    | clone 2    | 27. <b>3</b> V | P1          |             |             |                   |            |            |            |                 |            |
| 50        | <400> 104                                       |            |            |            |             |            |            |                |             |             |             |                   |            |            |            |                 |            |
|           |                                                 | Met i      | Ala i      | Ala.       | Asp (       | aly 1      | 'yr 1      | Leu 1          | Pro /       |             | rrp I<br>LO | ieu (             | Slu )      | Asp :      |            | Leu :<br>15     | Ser ,      |
| 55        |                                                 | Glu (      | Sly :      | Ile :      | Arg G<br>20 | lu 1       | Pp 1       | (tb            |             | Leu I<br>25 | Lys I       | ero (             | Sly )      |            | Pro 3      | Lys :           | Pro        |

|    | Lys        | Ala        | Asr<br>35  | Gln        | Gln        | Lys        | Gli        | 40         | ) Asp      | o Gly      | Arg        | G12        | / Lev<br>45 | Va]        | . Let       | Pro        |
|----|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|-------------|------------|-------------|------------|
| 5  | Gly        | Tyr<br>50  | : Lys      | Tyr        | Leu        | Gly        | 9rc<br>55  | Phe        | : Asr      | , ely      | Leu        | Asp<br>60  | Lys         | Gl)        | , elr       | Pro        |
| 10 | Val<br>65  | . Asn      | Glu        | Ala        | Asp        | Ala<br>70  | Ala        | Ala        | Let        | ı Glu      | His<br>75  | Asp        | ) Lys       | Ala        | Tyr         | Asp<br>80  |
| 15 | Lys        | Gln        | Leu        | Glu        | Gln<br>85  | Gly        | Asp        | Asn        | Pro        | 90         | Leu        | Lys        | Tyr         | Asn        | . His<br>95 | Ala        |
| .5 | Asp        | Ala        | Glu        | Phe<br>100 |            | Glu        | Arg        | Leu        | Gln<br>105 |            | Asp        | Thr        | Ser         | Phe<br>110 |             | Gly        |
| 20 | Asn        | Leu        | Gly<br>115 |            | Ala        | Val        | Phe        | Gln<br>120 | Äla        | Lys        | Lys        | Arg        | Val<br>125  | Leu        | Glu         | Pro        |
| 25 | Leu        | Gly<br>130 | Leu        | Val        | Glu        | Glu        | Gly<br>135 |            | Lys        | Thr        | Ala        | Ser<br>140 | Gly         | Lys        | Lys         | Arg        |
| 25 | Pro<br>145 |            | Glu        | Ser        | Pro        | Asp<br>150 | Ser        | Ser        | Thr        | Gly        | Ile<br>155 | Gly        | Lys         | Lys        | Gly         | Gln<br>160 |
| 30 | Gln        | Pro        | Ala        | Lys        | Lys<br>165 | Lys        | Leu        | neA        | Phe        | Gly<br>170 | Gln        | Thr        | Gly         | Asp        | Ser<br>175  | Glu        |
| 35 | Ser        | Val        | Pro        | Asp<br>180 | Pro        | Gln        | Pro        | Leu        | Gly<br>185 |            | Pro        | Pro        | Ala         | Ala<br>190 | Pro         | Ser        |
| 33 | Gly        | Leu        | Gly<br>195 | ser        | Gly        | Thr        | Met        | Ala<br>200 | Ala        | Gly        | Gly        | Gly        | Ala<br>205  | Pro        | Met         | Ala        |
| 40 | Asp        | Asn<br>210 | Asn        | Glu        | Gly        | Ala        | Asp<br>215 | Gly        | Val        | Gly        | Asn        | Ala<br>220 | Ser         | Gly        | Asn         | Trp        |
|    | His<br>225 | Cys        | Asp        | Ser        | Thr        | Trp<br>230 | Leu        | Gly        | Asp        | Arg        | Val<br>235 | Ile        | Thr         | Thr        | Ser         | Thr<br>240 |
|    | Arg        | Thr        | Trp        | Ala        | Leu<br>245 | Pro        | Thr        | Туг        | Asn        | Asn<br>250 | His        | Leu        | Tyr         | Lys        | Gln<br>255  | Ile        |
| 50 | Ser        | Ser        | Gln        | Ser<br>260 | Gly        | Ala        | Thr        | Asn        | Азр<br>265 | Asn        | His        | Phe        | Phe         | Gly<br>270 | Tyr         | Ser        |
|    | Thr        | Pro        | Trp<br>275 | Gly        | Tyr        | Phe        | Asp        | Phe<br>280 | Asn        | Arg        | Phe        | His        | Cys<br>285  | His        | Phe         | Ser        |
| 55 |            |            |            |            |            |            |            |            |            |            |            |            |             |            |             |            |

|           |   | Pro        | 290        |            | Tr         | Glr        | Arç        | 295        | ı Ile      | 8 As:      | n Asr        | Asr        | 300        |                    | y Phe        | e Arç      | g Pro        |
|-----------|---|------------|------------|------------|------------|------------|------------|------------|------------|------------|--------------|------------|------------|--------------------|--------------|------------|--------------|
| 5         |   | Arg<br>305 |            | Lev        | Arg        | g Phe      | Lys<br>310 |            | ı Pho      | e Ası      | n Ile        | Gln<br>315 |            | . Ly:              | G)           | ı Val      | . Thr<br>320 |
| 10        |   | Thr        | : Asn      | Asp        | Gly        | Val        |            | Thi        | : Ile      | Ala        | a Asn<br>330 |            | Lev        | Thi                | : Ser        | Thr<br>335 | Ile          |
|           |   | Gln        | Val        | Phe        | Ser<br>340 | _          | Ser        | Glu        | туг        | Glr<br>345 |              | Pro        | Туг        | Val                | . Leu<br>350 |            | Ser          |
| 15        |   | Ala        | His        | Gln<br>355 |            | Cys        | Leu        | Pro        | 9rc<br>360 |            | Pro          | Ala        | Asp        | Val<br>365         |              | Met        | Ile          |
| 20        |   | Pro        | Gln<br>370 |            | Gly        | Tyr        | Leu        | Thr<br>375 |            | Asn        | neK i        | Gly        | Ser<br>380 | Gln                | Ser          | Val        | Gly          |
| <i>25</i> |   | Arg<br>385 | Ser        | Ser        | Phe        | Суз        | Cys<br>390 | Leu        | Glu        | Tyr        | Phe          | Pro<br>395 | Ser        | Gln                | Met          | Leu        | Arg<br>400   |
| 25        |   | Thr        | Gly        | Asn        | Asn        | Phe<br>405 | Glu        | Phe        | Ser        | Tyr        | Thr<br>410   | Phe        | Glu        | Glu                | Val          | Pro<br>415 | Phe          |
| 30        |   | His        | Ser        | Ser        | Tyr<br>420 | Ala        | His        | Ser        | Gln        | Ser<br>425 |              | Asp        | Arg        | Leu                | Met<br>430   | Asn        | Pro          |
| 35        |   | Leu        | Ile        | Asp<br>435 | Gln        | Tyr        | Leu        | Tyr        | Tyr<br>440 | Leu        | Ala          | Arg        | Thr        | <b>Gln</b><br>445  | Ser          | Thr        | Thr          |
| 00        | ٠ | Gly        | Ser<br>450 | Thr        | Arg        | Glu        | Leu        | Gln<br>455 | Phe        | His        | Gln          | Ala        | Gly<br>460 | Pro                | Asn          | Thr        | Val          |
| 40        |   | Ala<br>465 | Glu<br>`   | Gln        | Ser        | Lys        | Asn<br>470 | Trp        | Leu        | Pro        | Gly          | Pro<br>475 | Сув        | Tyr                | Arg          | Gln        | Gln<br>480   |
| 45        |   | Arg        | Leu        | Ser        | Lys        | Asn<br>485 | Ile        | Asp        |            |            | Asn<br>490   |            | Ser        | Asn                | Phe          | Ala<br>495 | Trp          |
|           |   | Thr        | Gly        | Ala        | Thr<br>500 | Lys        | Tyr        | His        | Leu        | Asn<br>505 | Gly          | Arg        | Asn        | Ser                | Leu<br>510   | Thr        | Asn          |
| 50        | ; | Pro        | Gly        | Val<br>515 | Ala        | Met        | Ala        | Thr        | Asn<br>520 | Lys        | Asp          | Asp        | Glu        | <b>А</b> зр<br>525 | Gln          | Phe        | Leu          |
| <i>55</i> | • | Pro        | Ile<br>530 | neA        | Gly        | Val        | Leu        | Val<br>535 | Phe        | Gly        | Lys          |            | Gly<br>540 | Ala                | Ala          | Asn        | Lys          |
|           |   |            |            |            |            |            |            |            |            |            |              |            |            |                    |              |            |              |

|            |                                                   | Th:<br>545 | Th:        | r Lei      | ı Glu      | l Ası        | 550        | L Lev      | ı Met      | Th:        | Ser        | 555          | Glu        | Gli        | ı Ile      | ≥ Ly       | 560        |
|------------|---------------------------------------------------|------------|------------|------------|------------|--------------|------------|------------|------------|------------|------------|--------------|------------|------------|------------|------------|------------|
| 5          |                                                   | Thi        | C Ası      | n Pro      | Val        | Ala<br>565   | a Thi      | Glu        | Glu        | туг        | Gly<br>570 | Val          | Val        | . Sez      | : Sez      | As:        | a Leu<br>5 |
| 10         |                                                   | Gln        | ser        | Ser        | Thr<br>580 | Ala          | Gly        | Pro        | Arg        | Thr<br>585 | Gln        | Thr          | Val        | Asn        | Ser<br>590 |            | Gly        |
| . <u>.</u> |                                                   | Ala        | Leu        | Pro<br>595 | Gly        | Met          | Val        | Trp        | Gln<br>600 | Asn        | Arg        | Asp          | Val        | Tyr<br>605 |            | Gln        | Gly        |
| 15         |                                                   | Pro        | Ile<br>610 | Trp        | Ala        | Glu          | Ile        | Pro<br>615 | His        | Thr        | qzA        | Gly          | Asn<br>620 | Phe        | His        | Pro        | Ser        |
| 20         |                                                   | Pro<br>625 | Leu        | Met        | Gly        | Gly          | Phe<br>630 | Gly        | Leu        | Lys        | His        | Pro<br>635   | Pro        | Pro        | Gln        |            | Leu<br>640 |
| 0.5        |                                                   | Ile        | Lys        | Asn        | Thr        | Pro<br>645   | Val        | Pro        | Ala        | Asn        | Pro<br>650 |              | Glu        | Val        | Phe        | Thr<br>655 | Pro        |
| <i>25</i>  |                                                   | Ala        | Lys        | Phe        | Ala<br>660 | Ser          | Phe        | Ile        | Thr        | Gln<br>665 | Tyr        | Ser          | Thr        | Gly        | Gln<br>670 | Val        | Ser        |
| 30         |                                                   | Val        | Glu        | Ile<br>675 | Glu        | Trp          | Ğlu        | Leu        | Gln<br>680 | Lys        | Glu        | Asn          |            | Lys<br>685 | Arg        | Trp        | Asn        |
| 25         |                                                   | Pro        | Glu<br>690 | Ile        | Gln        | Tyr          | Thr        | Ser<br>695 | Asn        | Tyr        | Ala        | Lys          | Ser<br>700 | Asn        | Asn        | Val        | Glu        |
| 35         |                                                   | Phe<br>705 | Ala        | Val        | Asn .      | Asn          | Glu<br>710 | ej'A       | Val        | Tyr        | Thr        | Glu  <br>715 | Pro :      | Arg        | Pro        | Ile        | Gly<br>720 |
| 40         |                                                   | Thr        | Arg        | Tyr        |            | Thr .<br>725 | Arg .      | Asn :      | Leu        |            |            |              |            |            |            |            | ٠          |
| 45         | <210> 105<br><211> 728<br><212> PRT<br><213> caps |            | tein of    | AAV        | seroty     | pe, cl       | one 1      | 6.3VP      | 1          |            |            |              |            |            |            |            |            |
|            | <400> 105                                         |            |            |            |            |              |            |            |            |            |            |              |            |            |            |            |            |

|    |          |     |           |           |          |     |     | • • • •   |           | •         |     |     |           |           |           |     |
|----|----------|-----|-----------|-----------|----------|-----|-----|-----------|-----------|-----------|-----|-----|-----------|-----------|-----------|-----|
|    | Met<br>1 | Ala | Ala       | Asp       | Gly<br>5 | Туг | Leu | Pro       | Asp       | Trp<br>10 | Leu | Glu | Asp       | Asn       | Leu<br>15 | Ser |
| 5  | Glu      | Gly | Ile       | Arg<br>20 | Glu      | Trp | Trp | Asp       | Leu<br>25 | Lys       | Pro | Gly | Ala       | Pro<br>30 | Lys       | Pro |
| 10 | Lys      | Ala | Asn<br>35 | Gln       | Gln      | Lys | Gln | Asp<br>40 | Азр       | Gly       | Arg | Gly | Leu<br>45 | Val       | Leu       | Pro |
|    |          |     |           |           |          |     |     |           |           |           |     |     |           |           |           |     |
| 15 |          |     |           |           |          |     |     | -         | •         |           | :   |     |           |           |           |     |
| 20 |          |     |           |           |          |     |     |           |           |           |     |     |           |           |           |     |
| 25 |          |     |           |           |          |     |     |           |           |           |     |     |           |           |           |     |
|    |          |     |           |           |          |     |     |           |           |           |     |     |           |           |           |     |

| 5  |   | Gl         | у Туз<br>50 | r Ly:      | з Ту       | r Le       | ı Gl       | y Pro<br>55 | Phe        | e Asi      | n Gl       | y Leu          | Asr<br>60  | Ly:        | 3 Gly            | / Gl       | Pro        |
|----|---|------------|-------------|------------|------------|------------|------------|-------------|------------|------------|------------|----------------|------------|------------|------------------|------------|------------|
| J  |   | Va:<br>65  | l Ası       | ı Glı      | ı Ala      | a Ası      | 70         | Ala         | Ala        | ı Leı      | ı Glı      | His<br>75      | Asp        | Ly:        | . Ala            | ту         | qeA :      |
| 10 |   | Lys        | 3 Glr       | Lev        | ı Glu      | 85         | , e1?      | / Asp       | Asr        | Pro        | 90         | Leu            | Lys        | туг        | : Asn            | His<br>95  | Ala        |
| 15 | · | Asp        | Ala         | Glu        | 100        | Gln        | Glu        | Arg         | Leu        | Glr<br>105 |            | qsA ı          | Thr        | Ser        | Phe<br>110       |            | Gly        |
|    |   | Asn        | l Leu       | Gly<br>115 |            | Ala        | . Val      | Phe         | Gln<br>120 |            | Lys        | Lys            | Arg        | Val<br>125 |                  | Glu        | Pro        |
| 20 |   | Leu        | 130         | Leu        | Val        | Glu        | G1u        | Gly<br>135  |            | Lys        | Thr        | Ala            | Pro<br>140 |            | Lys              | Lys        | Arg        |
| 25 |   | Pro<br>145 | Ile         | Glu        | . Ser      | Pro        | Asp<br>150 | Ser         | Ser        | Thr        | Gly        | Ile<br>155     | Gly        | Lys        | Lys              | Gly        | Gln<br>160 |
|    |   | Gln        | Pro         | Ala        | Lys        | Lys<br>165 | Lys        | Leu         | Asn        | Phe        | Gly<br>170 | <b>G</b> ln    | Thr        | Gly        |                  | Ser<br>175 | Glu        |
| 30 |   | Ser        | Val         | Pro        | Asp<br>180 | Pro        | Gln        | Pro         | Leu        | Gly<br>185 |            | Pro            | Pro        | Ala        | Ala<br>190       | Pro        | Ser        |
| 35 |   | Gly        | Leu         | Gly<br>195 | Ser        | Gly        | Thr        | Met         | Ala<br>200 | Ala        | Gly        | eſλ            | Gly        | Ala<br>205 | Pro              | Met        | Ala        |
|    |   | Asp        | Asn<br>210  | Asn        | Glu        | Gly        | Ala        | Asp<br>215  | Gly        | Val        | Glÿ        | <b>As</b> n    | Ala<br>220 | Ser        | Gly <sup>.</sup> | aeA        | Trp        |
| 40 |   | His<br>225 | Суз         | Asp        | Ser        | Thr        | Trp<br>230 | Leu         | Gly        | Asp        | Arg        | <b>Val</b> 235 | Ile        | Thr        | Thr              | Ser        | Thr<br>240 |
| 45 |   | Arg        | Thr         | Trp        | Ala        | Leu<br>245 | Pro        | Thr         | Tyr        | Asn        | Asn<br>250 | His            | Leu        | Tyr        | Lys              | Gln<br>255 | Ile        |
|    |   | Ser        | Ser         | Gln        | Ser<br>260 | Gly        | Ala        | Thr         | Asn        | Asp<br>265 | Asn        | His            | Phe        | Phe        | Gly<br>270       | Tyr        | Ser        |
| 50 | , | Thr        | Pro         | Trp<br>275 | Gly        | Tyr        | Phe        | Asp         | Phe<br>280 | Asn        | Arg        | Phe            | His        | Cys<br>285 | His              | Phe        | Ser        |
| 55 |   | Pro        | Arg<br>290  | Asp        | Trp        | Gln        | Arg        | Leu<br>295  | Ile        | Asn        | Asn        |                | Trp<br>300 | Gly        | Phe              | Arg        | Pro        |
|    |   |            |             |            |            |            |            |             |            |            |            |                |            |            |                  |            |            |

| _          |    | 30:        |       | s Le  | u Ar  | g Pn         | 8 Ly:<br>31( |     | u Ph         | e As:      | n ii  | e G1:      |       | l Ly  | s Gl         | u Va.        | 1 Thr<br>320 |
|------------|----|------------|-------|-------|-------|--------------|--------------|-----|--------------|------------|-------|------------|-------|-------|--------------|--------------|--------------|
| 5          |    | Thi        | c Ası | n Asj | p Gly | y Va:<br>325 |              | Thi | e Ile        | a Ala      | a As: |            | ı Lei | ı Thi | s Se         | Th:<br>33    | r Ile        |
| 10         |    | Glr        | ı Val | l Phe | 340   |              | Sez          | Gli | ı Tyı        | Gl:<br>345 |       | ı Pro      | Y)    | r Val | 1 Let<br>350 |              | y Ser        |
| 15         |    | Ala        | His   | 355   |       | y Cys        | Leu          | Pro | ) Pro<br>360 |            | e Pro | Ala        | leA i | 365   |              | Met          | : Ile        |
|            |    | Pro        | 370   | Туг   | : Gly | Tyr          | Leu          | 375 |              | . Asr      | l Asr | a Gly      | 380   |       | ser          | Met          | Gly          |
| 20         |    | Arg<br>385 | Ser   | Ser   | Phe   | Tyr          | 390          |     | . Glu        | Tyr        | Phe   | 9ro<br>395 |       | Gln   | Met          | Leu          | Arg<br>400   |
| 25         |    |            |       |       |       | 405          |              |     |              |            | 410   |            |       |       |              | 415          |              |
|            |    |            |       |       | 420   |              |              |     |              | 425        |       |            |       |       | 430          |              | Pro          |
| 30         |    |            |       | 435   |       |              |              |     | 440          |            |       |            |       | 445   |              |              | Thr          |
| <b>3</b> 5 |    |            | 450   |       |       |              |              | 455 |              |            |       |            | 460   |       |              |              | Met          |
|            |    | 465        |       |       |       |              | 470          |     |              |            |       | 475        |       |       |              | Ala          | Gln<br>480   |
| 40         |    |            |       |       |       | 485          |              |     |              |            | 490   |            |       |       |              | 495          |              |
| 45         |    |            |       |       | 500   |              |              |     |              | 505        |       |            |       |       | 510          | Phe          |              |
|            |    |            |       | 515   |       |              |              |     | 520          |            |       |            |       | 525   |              | Asn          |              |
| 50         | s. |            | 530   |       |       |              |              | 535 |              |            |       | . •        | 540   |       |              | Lys          |              |
| 55         |    | 545        |       |       |       |              | 550          |     |              |            |       | 555        |       |       |              | <u>,   -</u> | 560          |

|    |                                  | The                | : Asr      | n Pro      | Val        | Ala<br>565 |            | Glu               | Glu        | 1 Tyr      | 570        |            | . Val      | . Ser        | Ser        | 575        |            |
|----|----------------------------------|--------------------|------------|------------|------------|------------|------------|-------------------|------------|------------|------------|------------|------------|--------------|------------|------------|------------|
| 5  |                                  | Glr                | Ser        | : Ser      | Thr<br>580 |            | Gly        | Pro               | Glr        | Thr<br>585 |            | Thr        | ' Val      | . Asn        | Ser<br>590 |            | Gly        |
| 10 |                                  | Ala                | Leu        | Pro<br>595 | Gly        | Met        | Val        | Trp               | Gln<br>600 |            | Arg        | , Asp      | Val        | . Tyr<br>605 |            | Gln        | Gly        |
| 45 |                                  | Pro                | Ile<br>610 |            | Ala        | Lys        | Ile        | Pro<br>615        | His        | Thr        | Asp        | Gly        | Asn<br>620 |              | His        | Pro        | Ser        |
| 15 |                                  | Pro<br><b>6</b> 25 |            | Met        | Gly        | Gly        | Phe<br>630 |                   | Leu        | Lys        | His        | Pro<br>635 |            | Pro          | Gln        | Ile        | Leu<br>640 |
| 20 |                                  | Ile                | Lys        | Asn        | Thr        | Pro<br>645 | Val        | Pro               | Ala        | Asn        | Pro<br>650 |            | eĵà        | Val          | Phe        | Thr<br>655 | Pro        |
| 25 |                                  | Ala                | Leu        | Phe        | Ala<br>660 | Ser        | Phe        | Ile               | Thr        | Gln<br>665 | Tyr        | Ser        | Thr        | Gly          | Gln<br>670 | Val        | Ser        |
| 25 |                                  | Val                | Glu        | Ile<br>675 | Glu        | Trp        | Glu        | Leu               | Gln<br>680 | Lys        | Glu        | Asn        | Ser        | Lys<br>685   | Arg        | Trp        | Asn        |
| 30 |                                  | Pro                | Glu<br>690 | Ile        | Gln        | Tyr        | Thr        | <b>Ser</b><br>695 | Asn        | Tyr        | Ala        | Lys        | Ser<br>700 | Asn          | neA        | Val        | Glu        |
| 35 |                                  | Phe<br>705         | Ala        | Val        | Asn        | Asn        | Glu<br>710 | Gly               | Val        | Tyr        | Thr        | Glu<br>715 | Pro        | Arg          | Pro        | Ile        | Gly<br>720 |
|    |                                  | Thr                | Arg        | Tyr        | Leu        | Thr<br>725 | Arg        | Asn               | Leu        |            |            |            |            |              |            |            |            |
| 40 | <210><br><211><br><212><br><213> | 728                | rotein     | of AA\     | V sero     | type,      | clone -    | 42.10             |            |            |            |            |            |              |            |            |            |
| 45 | <400>                            | 106                |            |            |            |            |            |                   |            |            |            |            |            |              |            |            |            |
|    |                                  |                    |            |            |            |            |            |                   |            |            |            |            |            |              |            |            |            |
| 50 |                                  | Met<br>1           | Ala        | Ala        | Asp        | Gly<br>5   | Tyr        | Leu               | Pro        | Asp<br>,   | Trp<br>10  | Leu        | Glu        | qeA          | neA        | Leu<br>15  | Ser        |
|    |                                  | Glu                | Gly        | Ile        | Arg<br>20  | Glu        | Trp        | Trp               | qeA        | Leu<br>25  | Lys        | Pro        | Gly        | Ala          | Pro<br>30  | Lys        | Pro        |
| 55 |                                  | Lys                | Ala        | Asn<br>35  | Gln        | Gln        | Lys        | Gln               | Asp<br>40  | Asp        | Gly        | Arg        | Gly        | Leu<br>45    | Val        | Leu        | Pro        |

| 5  | G1;        | у Ту:<br>50 | r Ly       | s Ty:      | r Lei      | u Gl       | y Pro<br>55 | Ph:        | e As:        | n Gly      | y Let      | 60         | p Ly       | s Gl       | y Gl       | u Pro      |
|----|------------|-------------|------------|------------|------------|------------|-------------|------------|--------------|------------|------------|------------|------------|------------|------------|------------|
| Ü  | Va:<br>65  | l Ası       | n Gli      | u Ala      | a Asj      | 70         | a Ala       | a Ala      | a Lei        | ı Glı      | His<br>75  | eA :       | p Lys      | s Ala      | а Ту       | RSP<br>80  |
| 10 | Lys        | Glr         | ı Leu      | ı Glı      | Glr<br>85  | ı Gly      | ,<br>Asp    | Asr.       | n Pro        | 90         | Leu        | Lys        | туз        | reA :      | 95         | Ala        |
|    | Ası        | Ala         | Glu        | Phe<br>100 | Glr        | ı Glu      | ı Arg       | Leu        | 1 Glr<br>105 |            | Asp        | Thr        | : Sei      | Phe 110    | e 613      | , ela      |
| 15 | Asn        | ı Lev       | Gly<br>115 | Arg        | Ala        | Val        | . Phe       | Gln<br>120 |              | Lys        | Lys        | Arg        | Val<br>125 |            | ı Glu      | Pro        |
| 20 | Leu        | Gly<br>130  | Leu        | Val        | Glu        | Glu        | Gly<br>135  |            | Lys          | Thr        | Ala        | Pro<br>140 |            | . Lya      | Lys        | Arg        |
|    | Pro<br>145 | İle         | Glu        | Ser        | Pro        | Asp<br>150 | Ser         | Ser        | Thr          | вĵу        | Ile<br>155 | Gly        | Arg        | Lys        | Gly        | Gln<br>160 |
| 25 | Gln        | Pro         | Ala        | Lys        | Lys<br>165 | Lys        | Leu         | Asn        | Phe          | Gly<br>170 | Gln        | Thr        | Gly        | Asp        | Ser<br>175 | Glu        |
| 30 | Ser        | Val         | Pro        | Asp<br>180 | Pro        | Gln        | Pro         | Ile        | Gly<br>185   | Glu        | Pro        | Pro        | Ala        | 190        | Pro        | Ser        |
|    | Gly        | Leu         | Gly<br>195 | Ser        | Glÿ        | Thr        | Met         | Ala<br>200 | Ala          | Gly        | Gly        | Gly        | Ala<br>205 | Pro        | Met        | Ala        |
| 35 | Ąsp        | Asn<br>210  | Asn        | Glu        | Gly        | Ala        | Asp<br>215  | Gly        | Val          | Gly        | Asn        | Ala<br>220 | Ser        | Gly        | Asn        | Trp        |
| 40 | His<br>225 | Cys         | Asp        | Ser        | Thr        | Trp<br>230 | Leu         | Gly        | Asp          | Arg        | Val<br>235 | Ile        | Thr        | Thr        | Ser        | Thr<br>240 |
|    | Arg        | Thr         | Trp        | Ala        | Leu<br>245 | Pro        | Thr         | Tyr        | Asn          | Asn<br>250 | His        | Leu        | Tyr        | Lys        | Gln<br>255 | Ile        |
| 45 | Ser        | Ser         | Gln        | Ser<br>260 | Gly        | Ala        | Thr         | Asn        | Asp<br>265   | Asn        | His        | Phe        | Phe        | Gly<br>270 | Tyr        | Ser        |
| 50 | Thr        | Pro         | Trp<br>275 | Gly        | Tyr        | Phe        |             | Phe<br>280 | neA          | Arg        | Phe :      | His        | Суз<br>285 | His        | Phe        | Ser        |
| ÷  | Pro        | Arg<br>290  | Asp        | Trp        | Gln        | Arg        | Leu<br>295  | Ile        | Asn          | Asn .      |            | Trp<br>300 | Gly        | Phe        | Arg        | Pro        |

| 5  | Arg<br>305 |            | Leu        | Arg        | Phe        | 110               | Leu                | Phe        | Asn        | Ile        | Gln<br>315 | Val        | Lys        | Glu        | Val        | Thr<br>320 |
|----|------------|------------|------------|------------|------------|-------------------|--------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| š  | Thr        | Asn        | Asp        | Gly        | Val<br>325 | Thr               | Thr                | Ile        | Ala        | Asn<br>330 | Asn        | Leu        | Thr        | ser        | Thr<br>335 | Ile        |
| 10 | Gln        | Val        | Phe        | Ser<br>340 | Asp        | Ser               | Glu                | Tyr        | Gln<br>345 | Leu        | Pro        | Tyr        | Val        | Leu<br>350 | Gly        | Ser        |
| 15 | Ala        | His        | Gln<br>355 | Gly        | Cys        | Leu               | Pro                | Pro<br>360 | Phe        | Pro        | Ala        | Asp        | Val<br>365 | Phe        | Met        | Ile        |
|    | Pro        | Gln<br>370 | Tyr        | Gly        | Tyr        | Leu               | Thr<br>375         | Leu        | Asn        | Asn        | Gly        | Ser<br>380 | Gln        | ser        | Val        | GJA        |
| 20 | Arg<br>385 |            | Ser        | Phe        |            | 390               | Leu                | Glu        | Tyr        | Phe        | Pro<br>395 | Ser        | Gln        | Met        | Leu        | Arg<br>400 |
| 25 | -Thr       | Gly        | aea        | Asn        | Phe<br>405 | Glu               | Phe                | Ser        | Tyr        | Thr<br>410 | Phe        | Glu        | Glu        | Val        | Pro<br>415 | Phe        |
|    | His        | Ser        | Ser        | Tyr<br>420 | Ala        | His               | Ser                | Gln        | Ser<br>425 | Leu        | Asp        | Arg        | Leu        | Met<br>430 | neA        | Pro        |
| 30 | Leu        | Ile        | Asp<br>435 | Gln        | Tyr        | Leu               | Tyr                | Tyr<br>440 | Leu        | Ala        | Arg        | Thr        | Gln<br>445 | Ser        | Thr        | Thr        |
| 35 | Gly        | Ser<br>450 | Thr        | Arg        | Glu        | Leu               | G <u>ln</u><br>455 | Phe        | His        | Gln        | Ala        | Gly<br>460 | Pro        | aeA        | Thr        | Met        |
|    | A1a<br>465 | Glu        | Gln        | Ser        | Lys        | Asn<br>470        | Trp                | Leu        | PIO        | Gly        | Pro<br>475 | Суз        | Tyr        | Arg        | Gln        | Gln<br>480 |
| 40 | Arg        | Leu        | Ser        | Lys        | Asn<br>485 | Ile               | qeA                | Ser        | Asn        | Asn<br>490 | Asn        | Ser        | Asn        | Phe        | Ala<br>495 | Trp        |
| 45 | Thr        | Gly        | Ala        | Thr<br>500 | Lys        | Tyr               | Ris                | Leu        | Asn<br>505 | G7À        | Aŗg        | Asn        | Ser        | Leu<br>510 | Thr        | Asn        |
|    | Pro        | Gly        | Val<br>515 | Ala        | Met        | Ala               | Thr                | Asn<br>520 | Lys        | Asp        | Asp        | Glu        | Asp<br>525 | Gln        | Phe        | Phe        |
| 50 | Pro        | Ile<br>530 | Asn        | Gly        | Val        | Leu               | Val<br>535         | Phe        | Gly        | Lys        | Thr        | Gly<br>540 | Ala        | Ala        | Asn        | Lys        |
| 55 | Thr<br>545 | Thr        | Leu        | Glu        | Asn        | <b>Val</b><br>550 | Leu                | Met        | Thr        | Ser        | Glu<br>555 | G]#        | Glu        | Ile        | Lys        | Thr<br>560 |

| 5         |                                          | Thr        | neA        | Pro        | Val        | Ala<br>565 |            | Glu               | Glu        | Tyr        | Gly<br>570 |            | Val        | . Ser      | Ser        | 575        | Leu        |
|-----------|------------------------------------------|------------|------------|------------|------------|------------|------------|-------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| 5         |                                          | Gln        | Ser        | Ser        | Thr<br>580 |            | Gly        | Pro               | Gln        | Thr<br>585 |            | Thr        | Val        | neA        | Ser<br>590 |            | Gly        |
| 10        | `                                        | Ala        | Leu        | Pro<br>595 | Gly        | Met        | Val        | Trp               | Gln<br>600 |            | Arg        | Asp        | Val        | Tyr<br>605 |            | Gln        | Gly        |
| 15        |                                          | Pro        | Ile<br>610 | Trp        | Ala        | Lys        | Ile        | Pro<br>615        |            | Thr        | Asp        | Gly        | Asn<br>620 | Phe        | His        | Pro        | Ser        |
|           |                                          | Pro<br>625 | Leu        | Met        | Gly        | eĵà        | Phe<br>630 | Gly               | Leu        | Lys        | His        | Pro<br>635 | Pro        | Pro        | Gln        | Ile        | Leu<br>640 |
| 20        |                                          | Ile        | Lys        | Asn        | Thr        | Pro<br>645 | Val        | Pro               | Ala        | Asn        | Pro<br>650 | Pro        | Glu        | Val        | Phe        | Thr<br>655 | Pro        |
| 25        |                                          | Ala        | Lys        | Phe        | Ala<br>660 | Ser        | Phe        | Ile               | Thr        | Gln<br>665 | Tyr        | Ser        | Thr        | Gly        | Gln<br>670 | Val        | Ser        |
|           |                                          | Val        | Glu        | Ile<br>675 | Glu        | Trp        | Glu        | Leu               | Gln<br>680 | Lys        | Glu        | Asn        | Ser        | Lys<br>685 | Arg        | Trp        | Asn        |
| 30        |                                          | Pro        | Glu<br>690 | Ile        | Gln        | Tyr        | Thr        | <b>Ser</b><br>695 | Asn        | Tyr        | Ala        | Lys        | Ser<br>700 | Asn        | Asn        | Val        | Glu        |
| <i>35</i> |                                          | Phe<br>705 | Ala        | Val        | aeA        | Asn        | Glu<br>710 | Gly               | Val        | Tyr        | Thr        | Glu<br>715 | Pio        | Arg        | Pro        | Ile        | Gly<br>720 |
|           |                                          | Thr        | Arg        | Tyr        |            | Thr<br>725 | Arg        | Asn               | Leu        | •          |            |            |            |            |            |            |            |
| 40        | <210> 1<br><211> 7<br><212> F<br><213> c | 28<br>PRT  | oroteir    | n of A     | AV se      | rotype     | , clon     | e 42.3            | 3B         |            |            |            |            |            |            |            | ,          |
| 45        | <400> 1                                  | 07         |            |            |            |            |            |                   |            |            |            |            |            |            |            |            |            |

|    |          |           |           |           |          | •   | EP        | 1 31      | 0 571     | В1        |     |           |           |           |           |     |
|----|----------|-----------|-----------|-----------|----------|-----|-----------|-----------|-----------|-----------|-----|-----------|-----------|-----------|-----------|-----|
|    | Met<br>1 | Ala       | Ala       | Asp       | Gly<br>5 | Tyr | Leu       | Pro       | Asp       | Trp<br>10 | Leu | Glu       | Asp       | Asn       | Leu<br>15 | Ser |
| 5  | Glu      | Gly       | Ile       | Arg<br>20 | Glu      | Trp | Trp       | Ąsp       | Leu<br>25 | Lys       | Pro | GJY       | Ala       | Pro<br>30 | Lys       | Pro |
| 10 | Lys      | Ala       | Asn<br>35 | Gln       | Gln      | ГÀа | Gln       | Asp<br>40 | ĄSp       | Gly       | Arg | Gly       | Leu<br>45 | Val       | Leu       | Pro |
|    | Gly      | Tyr<br>50 | Lys       | Tyr       | Leu      | Gly | Pro<br>55 | Phe       | Asn       | Gly       | Leu | Asp<br>60 | Lys       | Gly       | Glu       | Pro |
| 15 |          |           |           |           |          |     |           |           |           |           |     |           |           |           |           |     |
| 20 |          |           |           |           |          |     |           |           |           |           |     |           |           |           |           |     |
| 25 | ٠        |           |           |           |          |     |           |           |           |           |     |           |           |           |           |     |

| E          |   | V 6        | al As<br>5.  | n Gl         | u Al         | а Аз       | P A1       | a Al         | a Al       | a Le       | u Gli      | 1 Hi:        | s As       | p Ly       | s Al       | а Ту       | r Asp<br>80 |
|------------|---|------------|--------------|--------------|--------------|------------|------------|--------------|------------|------------|------------|--------------|------------|------------|------------|------------|-------------|
| 5          |   | Ly         | 75 Gl        | n Le         | u Gl         | u G1<br>85 | n Gl       | y As         | p As       | n Pr       | 90         | Lei          | ı Ly:      | з Ту       | r As       | n Hi<br>95 | s Ala       |
| 10         |   | As         | p Al         | a Gl         | u Pho<br>100 | e Gl       | n Gl       | u Ar         | g Le       | u Gl:      |            | Asp          | Thi        | Se:        | r Phe      |            | y Gly       |
| 15         |   | As         | n Le         | u Gl;<br>11: | y Arq<br>5   | Ala        | a Va       | l Phe        | 9 Gl:      | Ala        | Lys        | Lys          | Arg        | Va.<br>125 |            |            | u Pro       |
|            |   | Le         | u Gly<br>130 | y Lei        | ı Val        | . Glu      | ı Glı      | 4 Gly<br>135 | / Ala      | a Lys      | Thr        | Ala          | Pro        |            | / Lys      | Ly         | s Arg       |
| 20         |   | Pro<br>145 | o Ile<br>5   | e Glu        | ser          | Pro        | Asp<br>150 | Ser          | Ser        | Thr        | Gly        | Ile<br>155   | Gly        | Lys        | Lys        | G17        | Gln<br>160  |
| 25         |   | Gli        | n Pro        | Ala          | Lys          | Lys<br>165 | Lys        | Leu          | Asn        | Phe        | Gly<br>170 | Gln          | Thr        | Gly        | qeA v      | Ser<br>175 | Glu         |
|            |   | Ser        | Val          | Pro          | Asp<br>180   | Pro        | Gln        | Pro          | Ile        | Gly<br>185 | Glu        | Pro          | Pro        | Ala        | Gly<br>190 | Pro        | Ser         |
| 30         |   | Gly        | ' Leu        | Gly<br>195   | Ser          | Gly        | Thr        | Met          | Ala<br>200 | Ala        | Gly        | Gly          | Gly        | Ala<br>205 | Pro        | Met        | Àla         |
| <b>3</b> 5 |   | Asp        | 210          | Asn          | Glu          | Gly        | Ala        | Asp<br>215   | Gly        | Val        | Gly        | Asn          | Ala<br>220 | Ser        | GJĀ        | aeA        | Trp         |
|            |   | His<br>225 | Суз          | Asp          | Ser          | Thr        | Trp<br>230 | Leu          | Gly        | Asp        | Arg        | Val<br>235   | Ile        | Thr        | Thr        | ser        | Thr<br>240  |
| 40         |   | Arg        | Thr          | Trp          | Ala          | Leu<br>245 | Pro        | Thr          | Tyr        | Asn        | Asn<br>250 | His          | Leu        | Tyr        | Lys        | Gln<br>255 | Ile         |
| <b>45</b>  |   | Ser        | Ser          | Gln          | Ser<br>260   | Gly        | Ala        | Thr          | Asn        | Asp<br>265 | Asn :      | His          | Phe        | Phe        | Gly<br>270 | Tyr        | Ser         |
|            |   | Thr        | Pro          | Trp<br>275   | Gly          | Tyr        | Phe        | Asp          | Phe<br>280 | Asn .      | Arg :      | Phe 1        |            | Cys<br>285 | His        | Phe        | Ser         |
| 50         | 5 | Pro        | Arg<br>290   | Asp          | Trp          | Gln        | Arg        | Leu<br>295   | Ile        | Asn i      | Asn i      |              | Erp<br>300 | Gly        | Phe        | Arg        | Pro         |
| 55         |   | Arg<br>305 | Lys          | Leu          | Arg          | Phe        | Lys<br>310 | Leu          | Phe .      | neA        |            | Sln \<br>315 | /al :      | Lys        | Glu '      |            | Thr<br>320  |

| 5          | Tì         | ir As       | eA au             | p Gl       | y Va<br>32 | l Th              | r Th       | ır Il      | .e Al      | a · As<br>33 | n As<br>O    | n Le       | u Th       | r Se       | r Th<br>33   | r Ile<br>5 |
|------------|------------|-------------|-------------------|------------|------------|-------------------|------------|------------|------------|--------------|--------------|------------|------------|------------|--------------|------------|
| J          | G)         | n Va        | .l Ph             | e Se<br>34 | r As<br>O  | p Se              | er Gl      | u Ty       | r Gl<br>34 | n Le<br>5    | u Pr         | о Ту       | r Va       | l Le<br>35 |              | y Sei      |
| 10         | Al         | a Hi        | s Gl<br>35        | n Gl       | у су       | s Le              | u Pr       | o Pr<br>36 | o Ph<br>O  | e Pr         | o Al         | a As       | p Va:      | l Ph       | e Me         | t Ile      |
| 45         | Pr         | o Gl:<br>37 | n Ty:<br>0        | r Gl       | у Ту       | r Le              | u Th:      | r Lei      | ı Ası      | n Ası        | n Gly        | 7 Se:      | r Glr      | ı Se       | r Va         | l Gly      |
| 15         | Ar<br>38   | g Sei<br>5  | r Sei             | r.Phe      | э Туг      | r Cy:<br>39(      | s Lei<br>O | ı Glu      | ту:        | r Phe        | 9 Pro        | Sei        | r Gln      | Met        | Let          | Arg<br>400 |
| 20         | Th         | c Gly       | / Asr             | Asn        | Phe<br>405 | e Glu             | ı Phe      | Ser        | туг        | Thr<br>410   | Phe          | Glu        | . Glu      | Val        | Pro<br>415   | Phe        |
| 25         | His        | Ser         | Ser               | Tyr<br>420 | Ala        | His               | s Ser      | Gln        | Ser<br>425 | Leu          | Asp          | Arg        |            | Met<br>430 |              | Pro        |
| 25         | Lev        | Ile         | Asp<br>435        | Gln        | Tyr        | Leu               | Tyr        | Tyr<br>440 | Leu        | Ala          | Arg          | Thr        | Gln<br>445 | Ser        | Thr          | Thr        |
| 30         | Gly        | Ser<br>450  | Thr               | Arg        | Glu        | Leu               | Gln<br>455 | Phe        | His        | Gln          | Ala          | Gly<br>460 | Pro        | Asn        | Thr          | Met        |
| <i>35</i>  | Ala<br>465 | Glu         | Gln               | Ser        | Lys        | Asn<br>470        | Trp        | Leu        | Pro        | Gly          | Pro<br>475   | Суз        | Tyr        | Arg        | Gln          | Gln<br>480 |
|            | Arg        | Leu         | Ser               | Lys        | Asn<br>485 | Ile               | Asp        | Ser        | Asn        | Asn<br>490   | Thr          | Ser        | neA        | Phe        | Ala<br>495   | Trp        |
| 40         | Thr        | Gly         | Ala               | Thr<br>500 | Lys        | Tyr               | His        | Leu        | Asn<br>505 | Gly          | Arg          | Asn        | Ser        | Leu<br>510 | Thr          | , neA      |
| <b>4</b> 5 | Pro        | Gly         | <b>Val</b><br>515 | Ala        | Met        | Ala               | Thr        | Asn<br>520 | Lys        | qeA          | Asp          | Glu        | Asp<br>525 | Gln        | Phe          | Phe        |
|            | Pro        | Ile<br>530  | Asn               | Gly        | Val        | Leu               | Val<br>535 | Phe        | Gly        | Lys          | Thr          | Gly<br>540 | Ala.       | Ala        | Asn          | Lys        |
| 50         | Thr<br>545 | Thr         | Leu               | Glu .      | Asn        | <b>Val</b><br>550 | Leu        | Met '      | Thr        |              | Glu  <br>555 | Glu        | Glu :      | Ile        |              | Thr<br>560 |
| 55         | Thr        | Asn         | Pro               | Val :      | Ala<br>565 | Thr               | Glu        | Gln :      | Tyr        | Gly '<br>570 | Val '        | Val        | Ser :      |            | Asn :<br>575 | Leu        |
| JJ         |            |             |                   |            |            |                   |            |            |            |              |              |            |            |            |              |            |

| 5        |                        | GT.        | n Se        | r Se         | r Th:<br>58 | r Ala      | a Gl       | y Pr              | o Gl       | n Thi<br>585 | r Gli      | Thr        | Va]        | L As:      | n Se.<br>59 |           | n Gly        |
|----------|------------------------|------------|-------------|--------------|-------------|------------|------------|-------------------|------------|--------------|------------|------------|------------|------------|-------------|-----------|--------------|
|          | •                      | A).        | a Le        | u Pro<br>59: | o Gly<br>5  | y Met      | t Va       | l Tr              | 600        | a Asr        | Arç        | qeA ı      | Val        | 1 Ty:      | r Lei       | ı Gl      | n Gly        |
| 10       |                        | Pro        | 610         | e Try        | Ala         |            | 3 Ile      | Pro<br>615        | His        | Thr          | Asp        | Gly        | Asn<br>620 | Phe        | His         | Pr        | o Ser        |
| 15       |                        | Pro<br>625 | )<br>Lev    | ı Met        | : Gly       | · Gly      | Phe<br>630 | e Gly             | ' Leu      | Lys          | His        | Pro<br>635 | Pro        | Pro        | Glr.        | Il        | E Leu<br>640 |
| ,,       |                        | Ile        | Lys         | Asn          | Thr         | Pro<br>645 | Val        | . Pro             | Ala        | neA          | Pro<br>650 | Pro        | Glu        | Val        | Phe         | Th:       | Pro          |
| 20       |                        | Ala        | Lys         | Phe          | Ala<br>660  | Ser        | Phe        | Ile               | Thr        | Gln<br>665   | Tyr        | Ser        | Thr        | Gly        | Gln<br>670  | Val       | . Ser        |
| 25       |                        | Val        | Glu         | Ile<br>675   | Glu         | Trp        | Glu        | Leu               | Gln<br>680 | Lys          | Glu        | Asn        | Ser        | Lys<br>685 | Arg         | Trp       | Asn          |
| 25       |                        | Pro        | Glu<br>690  | Ile          | Gln         | Tyr        | Thr        | <b>Ser</b><br>695 | Asn        | Tyr          | Ala        | Lys        | Ser<br>700 | Asn        | Asn         | Val       | еjп          |
| 30       |                        | Phe<br>705 | Ala         | Val          | Asn         | Asn        | Glu<br>710 | Gly               | Val        | Tyr          | Thr        | Glu<br>715 | Pro        | Arg        | Pro         | Ile       | Gly<br>720   |
| 35       |                        | Thr        | Arg         | Tyr          |             | Thr<br>725 | Arg        | neA               | Leu        |              |            |            |            |            |             |           |              |
| <b>.</b> | <210> 108<br><211> 728 |            |             |              |             |            |            |                   |            |              |            |            |            |            | •           |           |              |
| 40       | <212> PR<br><213> cap  |            | otein a     | of AAV       | ' serot     | ype, c     | one 4      | 42.11             |            |              |            |            |            |            |             |           |              |
|          | <400> 108              | 3          | -           |              |             |            |            |                   |            |              |            |            |            |            |             |           |              |
| 45       | ·                      | Met .<br>1 | Ala .       | Ala .        | Asp (       | Gly '      | Tyr        | Leu :             | Pro 1      | Asp 1        | rp 1       | Seu G      | Slu /      | Asp :      |             | Leu<br>15 | Ser          |
| 50       |                        | Glu        | Gly         | Ile :        | Arg (<br>20 | Slu :      | Trp :      | Trp )             | Asp 1      | Leu I<br>25  | Lys I      | Pro G      | ly #       |            | Pro :       | Lys       | Pro          |
|          |                        | Lys i      | Ala i       | Asn (<br>35  | Gln (       | 3ln 1      | Lys (      | Gln #             | Asp A      | g qes        | ly A       | rg G       |            | eu \<br>5  | /al 1       | Leu       | Pro          |
| 55       |                        | Gly :      | ryr 1<br>50 | Lys 1        | ryr I       | eu (       | Sly 1      | Pro E             | be A       | sn G         | ly L       | eu A<br>6  |            | ys G       | Sly G       | Slu :     | Pro          |

| 5         | Va.<br>65  | l Ası      | n Ala      | a Ala      | e As       | 70         | a Ala         | a Ala      | a Leu      | ı Glı      | 1 Hi:      | s As       | p Ly         | s Al       | а Ту        | r Asp<br>80 |
|-----------|------------|------------|------------|------------|------------|------------|---------------|------------|------------|------------|------------|------------|--------------|------------|-------------|-------------|
|           | Gli        | n Gli      | n Lei      | ı Lys      | 85         | a Gl       | y As <u>r</u> | teA c      | n Pro      | 90         | Let        | ı Ar       | g Ty         | r Ası      | n Hi:<br>95 | s Ala       |
| 10        | Jek        | Ala        | a Glu      | Phe<br>100 |            | GIV        | ı Arg         | Leu        | Gln<br>105 |            | ı Asp      | Th         | c Se         | Phe<br>110 |             | A ejà       |
|           | Asn        | l Leu      | Gly<br>115 |            | Ala        | . Val      | . Phe         | Glr<br>120 |            | Lys        | Lys        | Arg        | 7 Val<br>125 |            | Gl:         | Pro         |
|           | Leu        | 130        | Leu        | Val        | Glu        | Glu        | Gly<br>135    |            | Lys        | Thr        | Ala        | Pro<br>140 |              | / Lys      | Lys         | Arg         |
| 20        | Pro<br>145 | Ile        | Glu        | Ser        | Pro        | Asp<br>150 |               | Ser        | Thr        | Gly        | Ile<br>155 | Gly        | . TAa        | Lys        | Gly         | Gln<br>160  |
| 25        | Gln        | Pro        | Ala        | Lys        | Lys<br>165 |            | Leu           | Asn        | Phe        | Gly<br>170 | Gln        | Thr        | Gly          | Asp        | Ser<br>175  | Glu         |
|           | Ser        | Val        | Pro        | Asp<br>180 | Pro        | Gln        | Pro           | Ile        | Gly<br>185 | Glu        | Pro        | Pro        | Ala          | Gly<br>190 | Pro         | Ser         |
| 30        | Gly        | Leu        | Gly<br>195 | Ser        | Gly        | Thr        | Met           | Ala<br>200 | Ala        | Gly        | Gly        | Gly        | Ala<br>205   | Pro        | Met         | Ala         |
| 35        | Asp        | Asn<br>210 | Asn        | Glu        | Gly        | Ala        | Asp<br>215    | Gly        | Val        | Glу        | Asn        | Ala<br>220 | Ser          | Gly        | Asn         | Trp         |
|           | His<br>225 | Cys        | qеA        | Ser        | Thr        | Trp<br>230 | Leu           | Gly        | Asp        | Arg        | Val<br>235 | Ile        | Thr          | Thr        | ser         | Thr<br>240  |
| 40        | Arg        | Thr        | Trp        | Ala        | Leu<br>245 | Pro        | Thr           | Tyr        | Asn        | Asn<br>250 | His        | Leu        | Tyr          | Lys        | Gln<br>255  | Ile         |
|           | ser        | Ser        | Gln        | Ser<br>260 | Gly        | Ala        | Thr           | Asn        | Аэр<br>265 | Asn        | His        | Phe        | Phe          | Gly<br>270 | Tyr         | Ser         |
| 43        | Thr        | Pro        | Trp<br>275 | Gly        | Tyr        | Phe        | qeA           | Phe<br>280 | Asn .      | Arg        | Phe        | His        | Cys<br>285   | His        | Phe         | Ser         |
| <i>50</i> | Pro        | Arg<br>290 | qeA        | Trp        | Gln        | Arg        | Leu<br>295    | Ile        | Asn .      | Asn        |            | Trp<br>300 | Gly          | Phe        | Arg         | Pro         |
| ,         | Arg<br>305 | Lys        | Leu        | Arg        |            | Lys<br>310 | Leu           | Phe .      | ae.A       |            | Gln<br>315 | Val        | Lys          | €]π        | Val         | Thr<br>320  |
|           |            |            |            |            |            |            |               |            |            |            |            |            |              |            |             |             |

| e          |   | Th         | r Ası      | n As       | p Gl       | y Va<br>32 | 1 Th.<br>5 | r Th       | r Il              | e Ala        | 33         | n As:<br>0 | n Le         | u Th         | r Se         | 33:        | r Ile      |
|------------|---|------------|------------|------------|------------|------------|------------|------------|-------------------|--------------|------------|------------|--------------|--------------|--------------|------------|------------|
| 5          |   | Gli        |            | l Pho      | e Se<br>34 | r As<br>O  | p Se       | r Gl       | ц Ту              | r Gl:<br>345 |            | u Pr       | Ty:          | r Val        | 1 Lei<br>350 |            | y Ser      |
| 10         | ٠ | Ala        | A His      | 355        | n Gl       | у Су       | s Lei      | ı Pro      | 360               | Phe          | e Pro      | o Ala      | A Ası        | 9 Val<br>365 |              | e Met      | : Ile      |
|            |   | Pro        | 370        | туг        | Gl;        | у Ту:      | r Lei      | Th:<br>375 | Leu               | a Asr        | neA i      | ı Gly      | 7 Sei<br>380 |              | se:          | : Va]      | . Gly      |
| 15         |   | Arg<br>385 | Ser        | Ser        | Phe        | • Туз      | 290<br>390 | Leu        | Glu               | Tyr          | Phe        | Pro<br>395 |              | : Gln        | Met          | Leu        | Arg<br>400 |
| 20         |   | Thr        | Gly        | ' Asn      | Asr        | Phe<br>405 | Glu        | Phe        | Ser               | Tyr          | Thr<br>410 |            | Glu          | Glu          | Val          | Pro<br>415 | Phe        |
| 25         |   | His        | Ser        | Ser        | Tyr<br>420 | Ala        | His        | Ser        | Gln               | Ser<br>425   | Leu        | qeA        | Arg          | Leu          | Met<br>430   | Asn        | Pro        |
| 23         |   | Leu        | Ile        | Asp<br>435 | Gln        | Tyr        | Leu        | туг        | Tyr<br>440        | Leu          | Ala        | Arg        | Thr          | Gln<br>445   | Ser          | Thr        | Thr        |
| 30         |   | Gly        | Ser<br>450 | Thr        | Arg        | Glu        | Leu        | Gln<br>455 | Phe               | His          | Gln        | Ala        | Gly<br>460   | Pro          | Asn          | Thr        | Met        |
| 35         |   | Ala<br>465 | Glu        | Gln        | Ser        | Lys        | Asn<br>470 | Trp        | Leu               | Pro          | Gly        | Pro<br>475 | Суз          | Tyr          | Arg          | Arg        | Gln<br>480 |
|            |   | Arg        | Leu        | Ser        | Lys        | Asp<br>485 | Ile        | Asp        | Ser               | Asn          | Asn<br>490 | Asn        | Ser          | Asn          | Phe          | Ala<br>495 | Trp        |
| 40         |   | Thr        | Gly        | Ala        | Thr<br>500 | Lys        | Tyr        | His        | Leu               | Asn<br>505   | Gly        | Arg        | Asn          | Ser          | Leu<br>510   | Thr        | Asn        |
| <b>4</b> 5 |   | Pro        | Gly        | Val<br>515 | Ala        | Met        | Ala        | Thr        | <b>Asn</b><br>520 | Lys          | Asp        | Asp        | Glu          | Asp<br>525   | Gln          | Phe        | Phe        |
|            |   | Pro        | Ile<br>530 | aeA        | Gly        | Val        | Leu        | Val<br>535 | Phe               | Gly          | rys        | Thr        | Gly<br>540   | Ala          | Ala          | Asn        | Lys        |
| 50         |   | Thr<br>545 | Thr        | Leu        | Glu        | Asn        | Val<br>550 | Leu        | Met               | Thr          | Ser        | Glu<br>555 | Glu          | Glu          | Ile          | Lys        | Thr<br>560 |
|            |   | Thr        | Asn        | Pro        | Val        | Ala<br>565 | Thr        | Glu        | Glu '             |              | Gly<br>570 | Val        | Val          | Ser          |              | Asn<br>575 | Leu        |

| 5         |                         | Gln        | Ser        | Ser        | Thr<br>580 |            | Gly          | Pro             | Gln        | Thr<br>585 | Gln        | Thr        | Val        | Asn        | Ser<br>590 |            | Gly        |
|-----------|-------------------------|------------|------------|------------|------------|------------|--------------|-----------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| J         |                         | Ala        | Leu        | Pro<br>595 |            | Met        | Val          | Trp             | 600        |            | Arg        | Asp        | Val        | Tyr<br>605 | Leu        | Gln        | Gly        |
| 10        | er en gr                | Pro        | Ile<br>610 |            | Ala        | Lys        | Ile          | Pro<br>615      | His        | Thr        | Asp        | Gly        | Asn<br>620 | Phe        | His        | Pro        | ser        |
| 15        |                         | Pro<br>625 |            | Met        | Gly        | Gly        | Phe<br>630   | Gly             | Leu        | Lys        | His        | Pro<br>635 | Pro        | Pro        | Gln        | Ile        | Leu<br>640 |
|           |                         | Ile        | Lys        | Asn        | Thr        | Pro<br>645 |              | Pro             | Ala        | Asn        | Pro<br>650 | Pro        | Glu        | Val        | Phe        | Thr<br>655 |            |
| 20        |                         | Ala        | Lys        | Phe        | Ala<br>660 | Ser        | Phe          | Ile             | Thr        | Gln<br>665 | Tyr        | Ser        | Thr        | Gly        | Gln<br>670 | Val        | Ser        |
| 25        |                         | Val        | Glu        | Ile<br>675 | Glu        | Trp        | Glu          | Leu             | Gln<br>680 | Lys        | G] u       | Asn        | Ser        | Lys<br>685 | Arg        | Trp        | Asn        |
|           |                         | Pro        | Glu<br>690 | Ile        | Gln        | Tyr        | Thr          | Ser<br>695      | Asn        | Tyr        | Ala        | Lys        | Ser<br>700 | Asn        | Asn        | Val        | Glu        |
| 30        |                         | Phe<br>705 | Ala        | Val        | Asn        | Asn        | Glu<br>710   | Gly             | Val        | Tyr        | Thr        | Glu<br>715 | Pro        | Arg        | Pro        | Ile        | Gly<br>720 |
| <i>35</i> | -                       | Thr        | Arg        | Tyr        | Leu        | Thr<br>725 | Arg          | Asn             | Leu        |            |            |            |            |            |            |            |            |
|           | <210> 109<br><211> 729  |            |            |            |            |            |              |                 |            |            |            |            |            |            |            |            |            |
| 40        | <212> PRT<br><213> caps |            | tein o     | f AAV      | seroty     | ype, ci    | ione F       | 1VP1            |            |            |            |            |            |            |            |            |            |
|           | <400> 109               |            |            |            |            |            |              |                 |            |            |            |            | •          |            |            |            |            |
| 45        | •                       | Met<br>1   | Ala        | Ala        | Asp        | Gly<br>5   | Tyr          | Leu             | Pro        | Asp        | Trp<br>10  | Leu        | Glu        | Asp        | Asn        | Leu<br>15  | ser        |
|           |                         | Glu        | Gly        | Ile        | Arg<br>20  | Glu        | Trp          | Trp             | Asp        | Leu<br>25  | Lys        | Pro        | Gly        | Ala        | Pro<br>30  | Lys        | Pro        |
| 50        | *                       | Lys        | Ala        | Asn<br>35  | Gln        | Gln        | Lys          | Gln             | Asp<br>40  | Asp        | Gly        | Arg        | Gly        | Leu<br>45  | Val        | Leu        | Pro        |
|           |                         | Gly        | Tyr<br>50  | Lys        | Tyr        | Leu        | Gly          | Pro<br>55       | Phe        | Asn        | Gly        | Leu        | Asp<br>00  | Lys        | Gly        | Glu        | Pro        |
| 55        |                         | -4.        |            | • • •      |            |            | <b>3</b> 3 = | <b>&gt;</b> 1 - | .1.        | 7          | <b>63</b>  | 102 -      | <b>5</b>   | •          | <b>.</b>   | <b>.</b>   | <b>.</b>   |
|           |                         | Val<br>65  | Asn        | Ala        | Ala        | Asp        | Ala<br>70    | ATE             | Ala        | Leu        | Glu        | His<br>75  | qeA        | ГÀЗ        | Ala        | Tyr        | Asp<br>Asp |

|           |   | G1         | n Gl       | n Le       | u Ly       | 's Al<br>85 | a G)  | ly As       | p As:        | n Pr       | о Ту<br>90             | r Le  | u Ar       | g Ty        | r As       | n Hi<br>95   |              |
|-----------|---|------------|------------|------------|------------|-------------|-------|-------------|--------------|------------|------------------------|-------|------------|-------------|------------|--------------|--------------|
| 5         |   | As         | p Al       | a Gl       | u Ph<br>10 | e G1        | n Gl  | lu Ar       | g Lei        | u G1:      | n Gl <sup>.</sup><br>5 | u As  | p Th       | r Se        | r Ph<br>11 |              | y Gl         |
| 10        |   | As         | n Le       | u Gl<br>11 | y Ar<br>5  | g Al        | a Va  | l Ph        | e Glr<br>120 | n Ala      | a Ly:                  | s Ly: | a Ar       | g Va.<br>12 |            | u Gl         | u Pro        |
| 15        |   | Le         | u Gl:      | y Le       | u Va       | l Gl        | u Gl  | u Gl;<br>13 | y Ala<br>5   | Lys        | Th:                    | : Ale | 140        |             | y Ly       | s Ly         | s Arg        |
|           |   | Pro<br>145 | o Ile      | e Ası      | Se:        | r Pro       | 150   | p Ser<br>O  | : Ser        | Thr        | : Gly                  | 11e   | Gly        | / Lys       | Lys        | s Gly        | y Gln<br>160 |
| 20        |   | Glr        | Pro        | Ala        | a Lys      | 165         | B Lys | s Lev       | neA ı        | Phe        | 61y<br>170             | Gln   | Thr        | Gly         | ' Asp      | 3 e s<br>175 | Glu          |
| 25        |   | Ser        | Val        | . Pro      | 180        | Pro         | Glr   | n Pro       | Leu          | Gly<br>185 | Glu                    | Pro   | Pro        | Ala         | Ala<br>190 |              | Ser          |
|           |   | Ser        | Val        | Gly<br>195 | 'Ser       | Gly         | Thr   | Met         | Ala<br>200   | Ala        | Gly                    | Gly   | Gly        | Ala<br>205  | Pro        | Met          | Ala          |
| 30        |   | Asp        | Asn<br>210 | Asn        | Glu        | Gly         | Ala   | Asp<br>215  | Gly          | Val        | Gly                    | Asn   | Ala<br>220 | Ser         | Gly        | ne.A         | Trp          |
| 35        |   | 225        |            |            |            |             | 230   |             |              |            |                        | 235   |            |             |            |              | Thr<br>240   |
|           |   |            |            |            |            | 245         |       | Thr         |              |            | 250                    |       |            |             |            | 255          |              |
| 40        |   |            |            |            | 260        |             |       | Ala         |              | 265        |                        |       |            |             | 270        |              |              |
| 45        |   |            |            | 273        |            |             |       | Phe         | 280          |            |                        |       |            | 285         |            |              |              |
|           |   |            | 290        |            |            |             |       | Arg<br>295  |              |            |                        |       | 300        |             |            |              | -            |
| 50        | ; | 305        |            |            |            |             | 310   | Lys         |              |            | ;                      | 315   |            |             |            |              | 320          |
| <i>55</i> |   | Thr        | Thr .      | Asn .      | qzA        | Gly<br>325  | Val   | Thr '       | Thr I        |            | Ala <i>I</i><br>330    | Lan ) | Asn :      | Leu '       |            | Ser '        | Thr          |

| 5 Ser Ala His Gln Gly Cys Leu Pro Pro Phe Pro Ale Asp Val Phe Met 355                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |         | V          | al G       | ln V        | al P)<br>34       | ne Se<br>40  | r As              | p Se       | er G       | lu T<br>3         | yr G<br>45 | ln Le      | u Pr       | :0 T) | yr Va<br>35 | l Le       | eu Gly |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|------------|------------|-------------|-------------------|--------------|-------------------|------------|------------|-------------------|------------|------------|------------|-------|-------------|------------|--------|
| 375 380  Gly Arg Ser Ser Phe Tyr Cys Leu Glu Tyr Phe Pro Ser Gln Met Leu 385 385  Arg Thr Gly Asn Asn Phe Glu Phe Ser Tyr Ser Phe Glu Asp Val Pro 405  Arg Thr Gly Asn Asn Phe Glu Phe Ser Tyr Ser Phe Glu Asp Val Pro 405  Phe His Ser Ser Tyr Ala His Ser Gln Ser Leu Asp Arg Leu Met Asn 425  Pro Leu Ile Asp Gln Tyr Leu Tyr Tyr Leu Ala Arg Thr Gln Ser Thr 435  Thr Gly Ser Thr Arg Glu Leu Gln Phe His Gln Ala Gly Pro Asn Thr 460  Met Ala Glu Gln Ser Lys Asn Trp Leu Pro Gly Pro Cys Tyr Arg Gln 465  Gln Gly Leu Ser Lys Asn Leu Asp Phe Asn Asn Asn Ser Asn Phe Ala 485  Trp Thr Ala Ala Thr Lys Tyr His Leu Asn Gly Arg Asn Ser Leu Thr 500  Asn Pro Gly Ile Pro Met Ala Thr Asn Lys Asp Asp Glu Asp Gln Phe 515  Phe Pro Ile Asn Gly Val Leu Val Phe Gly Lys Thr Gly Ala Ala Asn 530  Thr Thr Leu Glu Asn Val Leu Met Thr Ser Glu Glu Glu Ile Lys 545  Thr Thr Asn Pro Val Ala Thr Glu Glu Tyr Gly Val Val Ser Ser Asn 565  Leu Gln Pro Ser Thr Ala Gly Pro Gln Ser Gln Thr Ile Asn Ser Gln Ser Gln                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 5       | Se         | er A       | la H:<br>35 | is G)<br>55       | ln Gl        | у Су              | s Le       | u Pi<br>36 | 0 P1              | ro Ph      | ne Pr      | o Al       |       |             | l Pł       | e Met  |
| 150 Arg Thr Gly Asn Asn Phe Glu Phe Ser Tyr Ser Phe Glu Asp Val Pro 405 Arg Thr Gly Asn Asn Phe Glu Phe Ser Tyr Ser Leu Asp Arg Leu Met Asn 425 Pro Leu Ile Asp Gln Tyr Leu Tyr Tyr Leu Ala Arg Thr Gln Ser Thr 435 Pro Leu Ile Asp Gln Tyr Leu Tyr Tyr Leu Ala Arg Thr Gln Ser Thr 450 Pro Leu Ile Asp Gln Ser Lys Asn Trp Leu Pro Gly Pro Cys Tyr Arg Gln 465 Pro Gln Gly Leu Ser Lys Asn Leu Asp Phe Asn Asn Asn Ser Asn Phe Ala 485 Pro Asn Thr 500 Pro Met Ala Thr Lys Tyr His Leu Asn Gly Arg Asn Ser Leu Thr 500 Pro Gly Ile Pro Met Ala Thr Asn Lys Asp Asp Glu Asp Gln Phe 530 Pro Ile Asn Gly Val Leu Val Phe Gly Lys Thr Gly Ala Ala Asn 545 Pro Ile Asn Gly Val Leu Met Thr Ser Glu Glu Glu Ile Lys 545 Thr Thr Leu Glu Asn Val Leu Met Thr Ser Glu Glu Glu Ile Lys 545 Thr Thr Asn Pro Val Ala Thr Glu Glu Tyr Gly Val Val Ser Ser Asn 575 Leu Gln Pro Ser Thr Ala Gly Pro Gln Ser Gln Thr Ile Asn Ser Gln Ser Gln Thr Ile Asn Ser Gln 550 Pro Ser Gln Ser Gln Thr Ile Asn Ser Gln 550 Pro Ser Gln 550 Pro Ser Gln Thr Ile Asn Ser Gln 550 Pro Se | 10      | 13         | le Pi      | ro G)<br>70 | ln Ty             | r Gl         | у Ту              | r Le<br>37 | u Th       | ır Le             | ·u' As     | a As       |            |       | r Gl        | n Se       | r Val  |
| 20 Phe His Ser Ser Tyr Ala His Ser Glu Phe Ser Tyr Ser Phe Glu Asp Val Pro 415 Pro Leu Ile Asp Glu Tyr Leu Tyr Tyr Leu Ala Arg Thr Glu Ser Thr 435 Thr Gly Ser Thr Arg Glu Leu Glu Phe His Glu Ala Gly Pro Asn Thr 450  Met Ala Glu Gln Ser Lys Asn Trp Leu Pro Gly Pro Cys Tyr Arg Glu 475 Gln Gly Leu Ser Lys Asn Leu Asp Phe Asn Asn Asn Ser Asn Phe Ala 485  Trp Thr Ala Ala Thr Lys Tyr His Leu Asn Gly Arg Asn Ser Leu Thr 500  Asn Pro Gly Ile Pro Met Ala Thr Asn Lys Asn Lys Asp Asp Glu Asp Gln Phe Pro Ile Asn Gly Val Leu Val Phe Gly Lys Thr Gly Ala Ala Asn Ser Ser Asn Thr Asn Pro Val Ala Thr Glu Glu Tyr Gly Val Val Ser Ser Asn Leu Glu Fro Ser Thr Asn Pro Val Ala Thr Glu Glu Tyr Gly Val Val Ser Ser Asn Ser Leu Glu Fro Ser Thr Ala Gly Pro Gln Ser Glu Thr Ile Asn Ser Glu Glu Glu Ser Ser Ser Asn Ser Clu Glu Glu Fro Ser Thr Ala Gly Pro Gln Ser Glu Thr Ile Asn Ser Glu Ser  |         | G1<br>38   | у Аг<br>5  | g Se        | r Se              | r Phe        | 390<br>390        | r Cy       | s Le       | u Gl              | u Ty       | r Ph<br>39 | e Pro      | o Se  | r Gl        | n Me       |        |
| 20                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 15      | Ar         | g Th       | r Gl        | y As              | n Asr<br>405 | n Ph€             | e Gli      | u Ph       | e Se              | r Ty.      | r Se:<br>O | r Phe      | e Gl  | u Asp       |            |        |
| The Gly Ser The Arg Glu Leu Gln Phe His Gln Ala Gly Pro Asn The 455                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 20      | Ph         | e Hi       | s Se        | r Se:<br>420      | r Tyr        | Ala               | His        | s Se       | r Gl:             | n Sei<br>5 | r Lei      | ı Asp      | ) Ar  |             |            | : Asn  |
| Thr Gly Ser Thr Arg Glu Leu Gln Phe His Gln Ala Gly Pro Asn Thr 450 Met Ala Gly Gln Gln Gly Fro Asn Thr 465 Met Ala Glu Gln Gln Gly Gln Ser Lys Asn Leu Asp Phe Asn Asn Asn Ser Asn Phe Ala Ala Thr Lys Tyr His Leu Asn Gly Arg Asn Glu Asp Glu Asp Glu Asn Pro Si5 Fib                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |         | Pro        | o Le       | u Ile<br>43 | e Ası<br>5        | Gln          | Tyr               | Leu        | 1 Ty:      | r Ty:             | r Lei      | ı Ala      | Arg        |       |             | Sez        | Thr    |
| 35 Gln Gly Leu Ser Lys Asn Leu Asp Phe Asn Asn Asn Ser Asn Phe Ala 485 Trp Thr Ala Ala Thr Lys Tyr His Leu Asn Gly Arg Asn Ser Leu Thr 500 Asn Pro Gly Ile Pro Met Ala Thr S20 Phe Pro Ile Asn Gly Val Leu Pro Gly Lys Thr Gly Ala Ala Asn 500 Thr Thr Asn Pro Val Ala Thr Glu Glu Tyr Gly Val Ser Ser Asn 500 Thr Thr Asn Pro Val Ala Gly Pro Gln Ser Gln Thr Ile Asn Ser Gln 590 Leu Gln Pro Ser Thr Ala Gly Pro Gln Ser Gln Thr Ile Asn Ser Gln 590                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 25      | Thi        | 615<br>450 | y Sei       | Thr               | : Arg        | Glu               | Leu<br>455 | Glr        | Phe               | e His      | Gln        | Ala<br>460 | Gly   | Pro         | Asn        | Thr    |
| 35  Trp Thr Ala Ala Thr Lys Tyr His Leu Asn Gly Arg Asn Ser Leu Thr  40  Asn Pro Gly Ile Pro Met Ala Thr Son Val Leu Val Phe Gly Lys Thr Gly Ala Ala Asn  Phe Pro Ile Asn Gly Val Leu Val Phe Gly Lys Thr Glu Glu Ile Lys Son  Thr Thr Asn Pro Val Ala Thr Glu Glu Tyr Gly Val Val Ser Ser Asn  Leu Gln Pro Ser Thr Ala Gly Pro Gln Ser Gln Thr Ile Asn Ser Gln  590  The Tro Ser Thr Ala Gly Pro Gln Ser Gln Thr Ile Asn Ser Gln  590  The Tro Ser Gln  590  The Tro Ser Gln  590  Asn Ser Gln  590  Asn Ser Gln                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 30      | Met<br>465 | Ala        | a Glu       | Gln               | Ser          | Lys<br>470        | Asn        | Trp        | Leu               | Pro        | Gly<br>475 | Pro        | Cys   | Tyr         | Arg        |        |
| Trp Thr Ala Ala Thr Lys Tyr His Leu Asn Gly Arg Asn Ser Leu Thr 500  Asn Pro Gly Ile Pro Met Ala Thr 520 Asn Lys Asp Asp Glu Asp Gln Phe Pro Ile Asn Gly Val Leu S35 Val Phe Gly Lys Thr Gly Ala Ala Asn Lys S45  Lys Thr Thr Leu Glu Asn Val Leu Met Thr Ser Glu Glu Glu Ile Lys 560  Thr Thr Asn Pro Val Ala Thr Glu Glu Tyr Gly Val Val Ser Ser Asn 575  Leu Gln Pro Ser Thr Ala Gly Pro Gln Ser Gln Thr Ile Asn Ser Gln                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |         | Gln        | Gly        | / Leu       | Ser               | Lys<br>485   | Asn               | Leu        | Asp        | Phe               | Asn<br>490 | Asn        | Asn        | Ser   | Asn         | Phe<br>495 | Ala    |
| Phe Pro Ile Asn Gly Val Leu Val Phe Gly Lys Thr Gly Ala Ala Asn 530                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |         | Trp        | Thr        | Ala         | Ala<br>500        | Thr          | Lys               | Tyr        | His        | Leu<br>505        | Asn        | Gly        | Arg        | Asn   |             | Leu        | Thr    |
| Lys Thr Thr Leu Glu Asn Val Leu Met Thr Ser Glu Glu Glu Ile Lys 550  Thr Thr Asn Pro Val Ala Thr Glu Glu Tyr Gly Val Val Ser Ser Asn 565  Leu Gln Pro Ser Thr Ala Gly Pro Gln Ser Gln Thr Ile Asn Ser Gln 590                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 40      | Asn        | Pro        | Gly<br>515  | Ile               | Pro          | Met               | Ala        | Thr<br>520 | Asn               | Lys        | qeA        | Asp        |       | Asp         | Gln        | Phe    |
| Lys Thr Thr Leu Glu Asn Val Leu Met Thr Ser Glu Glu Glu Glu Ile Lys 550  Thr Thr Asn Pro Val Ala Thr Glu Glu Tyr Gly Val Val Ser Ser Asn 575  Leu Gln Pro Ser Thr Ala Gly Pro Gln Ser Gln Thr Ile Asn Ser Gln 590                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |         | Phe        | Pro<br>530 | Ile         | Asn               | Gly          | Val               | Leu<br>535 | Val        | Phe               | Gly        | Lys        | Thr<br>540 | ely   | Ala         | Ala        | Asn    |
| Leu Gln Pro Ser Thr Ala Gly Pro Gln Ser Gln Thr Ile Asn Ser Gln 580 585 590                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |         | Lys<br>545 | Thr        | Thr         | Leu               | Glu .        | <b>Asn</b><br>550 | Val        | Leu        | Met               | Thr        | Ser<br>555 | Glu        | Glu   | Glu         | Ile        |        |
| Leu Gln Pro Ser Thr Ala Gly Pro Gln Ser Gln Thr Ile Asn Ser Gln<br>580 585 590                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |         | Thr        | Thr        | Asn         | Pro               | Val 2<br>565 | Ala               | Thr        | Glu        | Glu               |            | Gly        | Val        | Val   | Ser         |            | Asn    |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | ·<br>55 | Leu        | Gln        | Pro         | <b>Ser</b><br>580 | Thr 1        | Ala (             | Gly :      | Pro        | <b>Gln</b><br>585 | Ser        | Gln        | Thr :      |       |             | Ser        | Gln    |

| 5         |                                  | Gly               | Ala        | Leu<br>595 |            | Gly        | Met        | . Val      | Trp<br>600 |            | neA        | Arg        | Asp        | Val<br>605        |            | Leu        | Gln        |
|-----------|----------------------------------|-------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|-------------------|------------|------------|------------|
|           |                                  | Gly               | Pro<br>610 | Ile        | Trp        | Ala        | Lys        | Ile<br>615 | Pro        | His        | Thr        | Asp        | Gly<br>620 | Asn               | Phe        | His        | Pro        |
| 10        |                                  | <b>Ser</b><br>625 | Pro        | Leu        | Met        | Gly        | 630        |            | Gly        | Leu        | Lys        | His<br>635 |            | Pro               | Pro        | Gln        | Ile<br>640 |
| 15        |                                  | Leu               | Ile        | Lys        | Asn        | Thr<br>645 | Pro        | Val        | Pro        | Ala        | Asn<br>650 | Pro        | Pro        | Glu               | Val        | Phe<br>655 | Thr        |
|           |                                  | Pro               | Ala        | Lys        | Phe<br>660 | Ala        | Ser        | Phe        | Ile        | Thr<br>665 | Gln        | Tyr        | Ser        | Thr               | Gly<br>670 | Gln        | Val        |
| 20        |                                  | Ser               | Val        | Glu<br>675 | Ile        | Glu        | Trp        | Glu        | Leu<br>680 | Gln        | Lys        | Glu        | Asn        | <b>Ser</b><br>685 | Lys        | Arg        | Trp        |
| 25        |                                  | Asn               | Pro<br>690 | Glu        | Ile        | Gln        | Tyr        | Thr<br>695 | Ser        | Asn        | Tyr        | Ala        | Lys<br>700 | Ser               | Asn        | Asn        | Val        |
|           |                                  | Glu<br>705        | Phe        | Ala        | Val        | Asn        | Pro<br>710 | Asp        | Gly        | Val        | Tyr        | Thr<br>715 | Glu        | Pro               | Arg        | Pro        | Ile<br>720 |
| 30        |                                  | Gly               | Thr        | Arg        | Tyr        | Leu<br>725 | Pro        | Arg        | Asn        | Leu        |            |            |            |                   | ٠          |            |            |
| <b>35</b> | <210><br><211><br><212><br><213> | 729               | rotein     | of AA      | V serc     | otype,     | clone      | F5VP       | 1@3        |            |            |            |            |                   |            |            |            |
| 40        | <400>                            | 110               |            |            |            |            |            |            |            |            |            |            |            |                   |            |            |            |

|           |     | Met<br>1  | Ala       | Ala              | Asp       | Gly<br>5  | Tyr       | Leu       | Pro       | Asp       | Trp<br>10 | Leu       | Glu       | Asp       | Asn       | Leu<br>15 | Ser       |
|-----------|-----|-----------|-----------|------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| 5         |     | Glu       | Gly       | Ile              | Arg<br>20 | Ģlu       | Trp       | Trp       | Asp       | Leu<br>25 | Lys       | Pro       | Gly       | Ala       | Pro<br>30 | Lys       | Pro       |
| 10        |     | Lys       | Ala       | Asn<br>35        | Gln       | Gln       | Lys       | Gln       | Asp<br>40 | qeA       | Gly       | Arg       | Gly       | Leu<br>45 | Val       | Leu       | Pro       |
|           |     | Gly       | Туг<br>50 | Lys              | Tyr       | Leu       | Gly       | Pro<br>55 | Phe       | Asn       | Gly       | Leu       | Asp<br>60 | Lys       | Gly       | Glu       | Pro       |
| 15        |     | Val<br>65 | Asn       | Ala              | Ala       | qsA       | Ala<br>70 | Ala       | Ala       | Leu       | Glu       | His<br>75 | Asp       | Lys       | Ala       | Tyr       | qzA<br>08 |
| 20        |     | Gln       | Gln       | Leu <sub>.</sub> | Lys       | Ala<br>85 | ejà       | Asp       | neA       | Pro       | Туг<br>90 | Leu       | Arg       | Tyr       | neA       | His<br>95 | Ala       |
|           | ¥ 1 |           |           |                  |           |           |           |           |           |           |           |           |           |           |           |           |           |
| <i>25</i> | ·   | ٠         |           |                  |           |           |           |           |           |           |           |           |           |           |           |           |           |
| 30        |     |           |           |                  |           |           |           |           |           |           |           |           |           |           |           |           |           |
|           |     |           |           |                  |           |           |           |           |           |           |           |           |           |           |           |           |           |
| 35        |     |           |           |                  |           |           |           |           |           |           |           |           |           |           |           |           |           |
| 40        |     |           |           |                  |           |           |           |           |           |           |           |           |           |           |           |           |           |
| •         |     |           | ٠.        |                  |           |           |           |           |           |           |           |           |           |           |           |           |           |
| 45        |     |           |           |                  |           |           |           |           |           |           |           |           |           |           |           |           |           |
| 50        |     |           |           |                  |           |           |           |           |           |           |           |           |           |           |           |           |           |
|           | •   |           |           |                  |           |           |           |           |           |           |           |           |           |           |           |           |           |
| 55        |     |           |           |                  |           |           |           |           |           |           |           |           |           |           |           |           |           |

|    | Ąsp        | Ala        | Glu        | Phe<br>100 | Gln        | Glu         | ı Arg      | Leu        | 105        |                    | Asp        | Thi        | : Ser      | Phe<br>110 |            | / Gly      |
|----|------------|------------|------------|------------|------------|-------------|------------|------------|------------|--------------------|------------|------------|------------|------------|------------|------------|
|    | Asn        | Leu        | Gly<br>115 |            | Ala        | . Val       | l Phe      | Gln<br>120 |            | Lys                | Lys        | Arg        | Val<br>125 |            | Glu        | Pro        |
| 10 | Leu        | Gly<br>130 | Leu        | Val        | Glu        | Glu         | Gly<br>135 |            | Lys        | Thr                | Ala        | Pro<br>140 |            | Lys        | Lys        | Arg        |
| 15 | Pro<br>145 | Ile        | qeA        | Ser        | Pro        | Asp<br>150  |            | Ser        | Thr        | Gly                | Ile<br>155 | Gly        | Lys        | Lys        | Gly        | Gln<br>160 |
|    | Gln        | Pro        | Ala        | Lys        | Lys<br>165 | Lys         | Leu        | Asn        | Phe        | <b>G</b> ly<br>170 | Gln        | Thr        | Gly        | qeA        | Ser<br>175 | elu        |
| 20 | Ser        | Val        | Pro        | Asp<br>180 | Pro        | Gln         | Pro        | Leu        | Gly<br>185 |                    | Pro        | Pro        | Ala        | Ala<br>190 | Pro        | Ser        |
| 25 | Ser        | Val        | Gly<br>195 | Ser        | Gly        | Thr         | Met        | Ala<br>200 | Ala        | Gly                | Gly        | Gly        | Ala<br>205 | Pro        | Thr        | Ala        |
|    | Asp        | Asn<br>210 | Asn        | Glu        | Gly        | Ala         | Asp<br>215 | Gly        | Val        | Gly                | Asn        | Ala<br>220 | Ser        | Gly        | Asn        | Trp        |
| 30 | His<br>225 | Cys        | Asp        | Ser        | Thr        | Trp-<br>230 | Leu        | Gly        | Asp        | Arg                | Val<br>235 | Ile        | Thr        | Thr        | Ser        | Thr<br>240 |
| 35 | Arg        | Thr        | Trp        | Ala        | Leu<br>245 | Pro         | Thr        | Tyr        | Asn        | Asn<br>250         | His        | Leu        | Tyr        | Lys        | Gln<br>255 | Ile        |
|    | Ser        | Ser        | Ser        | Ser<br>260 | Ser        | Gly         | Ala        | Thr        | Asn<br>265 | Asp                | Asn        | His        | Tyr        | Phe<br>270 | Gly        | Tyr        |
| 40 | Ser        | Thr        | Pro<br>275 |            | Gly        | Tyr         | Phe        | Asp<br>280 | Phe        | Asn                | Arg        | Phe        | His<br>285 | Cys        | His        | Phe        |
| 45 | Ser        | Pro<br>290 | Arg        | qeA        | Trp        | Gln         | Arg<br>295 | Leu        | Ile        | Asn                | Asn        | Asn<br>300 | Trp        | Gly        | Phe        | Arg        |
|    | Pro<br>305 | Lys        | Lys        | Leu        | Arg        | Phe<br>310  | Lys        | Leu        | Phe        | Asn                | Ile<br>315 | Gln        | Val        | Lys        | Glu        | Val<br>320 |
|    | Thr        | Thr        | Asn .      |            | Gly<br>325 | Val         | Thr        | Thr        | Ile        | Ala<br>330         | Asn        | Asn        | Leu        | Thr        | Ser<br>335 | Thr        |
| 55 | Val        | Gln        |            | Phe<br>340 | Ser        | qeA         | Ser        |            | Tyr<br>345 | Gln                | Leu        | Pro        | Tyr        | Val<br>350 | Leu        | Gly        |

|    |         | Sei        | : Al       | a Hi<br>35 | s Gl<br>5  | n Gl       | у Су       | s Le        | u Pro<br>36 | o Pr                | o Ph       | e Pro        | Al         | a As<br>36 |            | l Ph              | e Met      |
|----|---------|------------|------------|------------|------------|------------|------------|-------------|-------------|---------------------|------------|--------------|------------|------------|------------|-------------------|------------|
| 5  |         | Ile        | 9 Pro      | o Gli      | n Ty       | r Gl       | Y TY       | r Lei<br>37 | u Th:<br>5  | r Le                | u As:      | n Asr        | 38         |            | r Gl       | n Se              | r Val      |
| 10 |         | Gly<br>385 | Arg        | 3 Se       | r Se:      | r Ph       | е Ту<br>39 | r Cys       | 3 Let       | ı Glı               | а Ту       | r Phe<br>395 |            | o Se       | r Gli      | n Me              | Leu<br>400 |
| 15 |         | Arg        | Thz        | ely        | / Asi      | A91<br>204 | n Pho      | e Glu       | 1 Phe       | e Sei               | 410        |              | Phe        | e Gl       | ge A       | Val               | Pro        |
|    |         | Phe        | His        | Ser        | Sex<br>420 | ту:<br>)   | : Ale      | a His       | Ser         | Gln<br>425          | Ser        | Leu          | Asp        | Arg        | 430        |                   | : Asn      |
| 20 | :       | Pro        | Leu        | 11e<br>435 | Asp        | Gln        | Туг        | : Leu       | Tyr<br>440  | Tyr                 | Leu        | Ala          | Arg        | Thr<br>445 |            | Ser               | Thr        |
| 25 | •       | Thr        | Gly<br>450 | Ser        | Thr        | Arg        | Glu        | Leu<br>455  | Gln         | Phe                 | His        | Gln          | Ala<br>460 |            | Pro        | Asn               | Thr        |
|    | 1       | Met<br>465 | Ala        | Glu        | Gln        | Ser        | Lys<br>470 | Asn         | Trp         | Leu                 | Pro        | Gly<br>475   | Pro        | Суз        | Tyr        | Arg               | Gln<br>480 |
| 30 | C       | 3ln        | Arg        | Leu        | Ser        | Lys<br>485 | asa        | Leu         | Asp         | Phe                 | Asn<br>490 | Asn          | Asn        | Ser        | Asn        | Phe<br>495        | Ala        |
| 35 | ī       | , Eb       | Thr        | Ala        | Ala<br>500 | Thr        | Lys        | Tyr         | His         | Leu<br>505          | Asn        | Gly          | Arg        | Asn        | Ser<br>510 | Leu               | Thr        |
| •  | 24      | sn         | Pro        | Gly<br>515 | Ile        | Pro        | Met        | Ala         | Thr<br>520  | Asn                 | Lys        | Asp          | qeA        | Glu<br>525 | Asp        | Gln               | Phe        |
| 40 | P       | he         | Pro<br>530 | Ile        | Asn        | Gly        | Val        | Leu<br>535  | Val         | Phe                 | Gly        |              | Thr<br>540 | Gly        | Ala        | Ala               | Asn        |
| 45 | 1.<br>5 | ys<br>45   | Thr        | Thr        | Leu        | Glu        | Asn<br>550 | Val         | Leu         | Met                 | Thr        | Ser          | Glu        | Glu        | Glu        | Ile               | Lys<br>560 |
|    | T       | hr '       | Thr        | Asn        | Pro        | Val<br>565 | Ala        | Thr         | Glu         | Glu                 | Tyr<br>570 | Gly '        | Val        | Val        | Ser        | <b>Ser</b><br>575 | Asn        |
| 50 | Į.      | eu (       | 5ln        | Ser        | Ser<br>580 | Thr        | Ala        | Gly         | Pro         | Gln<br>5 <b>8</b> 5 | Ser        | Gln :        | Thr        | Ile        | Asn<br>590 | Ser               | Gln        |
| 55 | G:      | ly A       | Ala :      | Leu<br>595 | Pro        | Gly        | Met        | Val '       | Trp (       | Gln :               | Asn .      | Arg )        |            | Val<br>605 | Tyr        | Leu               | Gln        |

|    |                                                | G:         | ly P:<br>6: | ro I.<br>10 | le T       | rp Al        | a Ly       | s Il<br>61 | e Pr<br>5  | ю ні  | is Th       | r As       | p G1<br>62 | y A:<br>0 | n P        | he H       | is Pro        |
|----|------------------------------------------------|------------|-------------|-------------|------------|--------------|------------|------------|------------|-------|-------------|------------|------------|-----------|------------|------------|---------------|
| 5  |                                                | S 6 2      | er Pi       | ro Le       | еп Ме      | et Gl        | y G1<br>63 | y Pho      | e Gl       | y Le  | n Gl        | u Hi<br>63 | 5          | o Pr      | :0 P:      | ro G:      | ln Ile<br>640 |
| 10 |                                                | Le         | u Il        | le Ly       | 'S As      | n Th.<br>64. | r Pro      | Va)        | l Pr       | o Al  | a As:<br>65 | n Pro      | o Pro      | o Gl      | u Vē       | 1 P)<br>65 | ne Thr<br>55  |
| 15 |                                                | Pr         | o Al        | a Ly        | s Ph<br>66 | e Ala        | a Ser      | Phe        | : Ile      | e Th. | r Gli<br>5  | a Ty       | s Sez      | Th        | r G1<br>67 |            | n Val         |
|    | ٠.                                             | Se         | r Va        | 1 Gl<br>67  | u Il<br>5  | e Gli        | Trp        | Glu        | Let<br>680 | ı Glı | n Lys       | Glu        | Asn        | Se:       |            | s Ar       | g Trp         |
| 20 |                                                |            | 05          | U           |            |              |            | 695        |            |       |             |            | 700        |           |            |            | n Val         |
| 25 |                                                | , 0.       |             |             |            |              | /10        |            |            |       |             | Thr<br>715 | Glu        | Pro       | Ar         | g Pr       | 720           |
|    |                                                | GTA        | Thi         | . Arç       | , Tyr      | 725          | Thr        | Arg        | Asn        | Leu   |             |            |            |           |            |            |               |
| 30 | <210> (211> )<br><211> )<br><212> )<br><213> ( | 729<br>PRT | protei      | n of A      | AV se      | rotype       | , clone    | F3VP       | 1          |       |             |            |            |           |            |            | ,             |
| 35 | <400> '                                        |            |             |             |            |              |            |            |            |       |             |            |            |           |            |            |               |
| 40 |                                                | _          |             |             |            | Gly<br>5     |            |            |            |       | 10          |            |            |           |            | 15         |               |
|    |                                                |            |             |             | 20         | Glu          |            |            |            | 25    |             |            |            |           | 30         |            |               |
| 45 |                                                |            |             | 55          |            | Gln          |            | •          | 40         |       |             |            |            | 45        |            |            |               |
| 50 |                                                |            | 50          |             |            | Leu          | • •        | 33         |            |       |             |            | 60         |           |            |            |               |
|    | ,                                              | Ų.         |             |             |            |              | 70         |            |            |       |             | 75         |            |           |            |            | 80            |
| 55 |                                                | Gln        | Gln         | Leu         | Lys        | Ala (<br>85  | Sly #      | A qe.      | sn I       | Pro ! | Tyr 1<br>90 | Leu J      | Arg 1      | yr i      | Asn        | His<br>95  | Ala           |

|    |   | Asp        | Ala        | a Glu      | 1 Phe<br>100 | e Glr      | ı Glı      | ı Arg        | Lev        | 1 Glr<br>105 |            | y Yab        | Thi        | Ser        | Phe 110           |            | / Gly      |
|----|---|------------|------------|------------|--------------|------------|------------|--------------|------------|--------------|------------|--------------|------------|------------|-------------------|------------|------------|
| 5  |   | Asn        | l Leu      | 115        | y Arç        | , Ala      | va:        | l Phe        | Glr<br>120 |              | a Lys      | . Lys        | Arg        | Val<br>125 |                   | Glu        | Pro        |
| 10 |   | Leu        | Gly<br>130 | / Leu      | val          | . Glu      | Glu        | 1 Gly<br>135 |            | Lys          | Thr        | : Ala        | Pro<br>140 |            | ' Lya             | Lys        | Arg        |
| 15 | · | Pro<br>145 | Ile        | Gly        | 'Ser         | Pro        | Asp<br>150 | Ser          | Ser        | Thr          | : Gly      | Ile<br>  155 |            | Lys        | Lys               | Gly        | Gln<br>160 |
|    |   | Gln        | Pro        | Ala        | Lys          | Lys<br>165 | Lys        | Leu          | Asn        | Phe          | Gly<br>170 |              | Thr        | Gly        | Asp               | Ser<br>175 |            |
| 20 |   | Ser        | Val        | Pro        | Asp<br>180   | Pro        | Gln        | Pro          | Leu        | Gly<br>185   |            | Pro          | Pro        | Ala        | Ala<br>190        |            | Ser        |
| 25 |   | Ser        | Val        | Gly<br>195 |              | Gly        | Thr        | Met          | Ala<br>200 | Ala          | Gly        | Gly          | Gly        | Ala<br>205 |                   | Met        | Ala        |
|    |   | Asp        | Asn<br>210 | Asn        | Glu          | Gly        | Ala        | Asp<br>215   | Gly        | Val          | Gly        | Asn          | Ala<br>220 | Ser        | Gly               | Asn        | Trp        |
| 30 |   | His<br>225 | Суз        | qeA        | Ser          | Thr        | Trp<br>230 | Leu          | Gly        | Asp          | Arg        | Val<br>235   | Ile        | Thr        | Thr               | Ser        | Thr<br>240 |
| 35 |   | Arg        | Thr        | Trp        | Ala          | Leu<br>245 | Pro        | Thr          | Tyr        | Asn          | Asn<br>250 | His          | Leu        | Tyr        | Lys               | Gln<br>255 | Ile        |
|    | • | Ser        | Ser        | Ser        | Ser<br>260   | Ser        | Gly        | Ala          | Thr        | Asn<br>265   | Asp        | Asn          | His        | Tyr        | Phe<br>270        | Gly        | Tyr        |
| 40 |   | Ser        | Thr        | Pro<br>275 | Trp          | Gly        | Tyr        | Phe          | Asp<br>280 | Phe          | Asn        | Arg          | Phe        | His<br>285 | Суз               | His        | Phe        |
| 45 |   | Ser        | Pro<br>290 | Arg        | Asp          | Trp        | Gln        | Arg<br>295   | Leu        | Ile          | Asn        |              | Asn<br>300 | Trp        | Gly               | Phe        | Arg        |
|    |   | Pro<br>305 | Lys        | Lys        | Leu          | Arg        | Phe<br>310 | Lys          | Leu        | Leu          | Asn        | Ile<br>315   | Gln        | Val        | Lys               | Glu        | Val<br>320 |
| 50 | ÷ | Thr        | Thr        | Asn        | Asp          | Gly<br>325 | Val        | Thr          | Thr        | Ile          | Ala<br>330 | Asn .        | Asn        | Leu        | Thr               | Ser<br>335 | Thr        |
| 55 |   | Val        | Gln        | Val        | Phe<br>340   | Ser        | qeA        | Ser          | Glu        | Tyr<br>345   | Gln        | Leu          | Pro        | Tyr        | <b>Val</b><br>350 | Leu        | Gly        |

|           | Ser        | : Ale      | 355        | Gli<br>G   | n Gly      | y Cy:      | s Lei        | 360        | Pro               | o Phe      | e Pro      | Al.        | A Asj             |            | l Ph                      | e Met              |
|-----------|------------|------------|------------|------------|------------|------------|--------------|------------|-------------------|------------|------------|------------|-------------------|------------|---------------------------|--------------------|
| 5         | Ile        | 9rc        | o Glm      | туі        | c Gly      | у Ту       | r Leu<br>375 | Th:        | Lei               | ı Asp      | ) Asr      | 380        |                   | r Gli      | n Se.                     | r Val              |
| 10        | Gly<br>385 | Arg        | , Ser      | Ser        | Phe        | 390        | c Cys        | Lev        | ı Glu             | тух        | Phe<br>395 |            | Sez               | Gli        | n Met                     | Leu<br>400         |
| 15        | Arg        | Thr        | : Gly      | ne.A       | 405        |            | e Glu        | Phe        | Ser               | Tyr<br>410 |            | Phe        | e Glu             | ı Asp      | Va:                       | l Pro              |
|           | Phe        | His        | Ser        | Ser<br>420 | Tyr        | Ala        |              | Ser        | Gln<br>425        |            | Leu        | , Asp      | Arg               | 430        |                           | : Asn              |
| 20        | Pro        | ren        | Ile<br>435 | qeA        | Gln        | Tyr        |              |            |                   | Leu        | Ala        | Arg        | Thr<br>445        |            | Ser                       | Thr                |
| 25        | Thr        | Gly<br>450 | Ser        | Thr        | Arg        | Glu        | Leu<br>455   | Gln        | Phe               | His        | Gln        | Ala<br>460 |                   | Pro        | Asn                       | The                |
|           | Met<br>465 | Ala        | Glu        | Gln        | Ser        | Lys<br>470 | Asn          | Trp        | Leu               | Pro        | Gly<br>475 | Pro        | Суз               | Tyr        | Arg                       | Gln<br>48 <b>0</b> |
| 30        | Gln        | Arg        | Leu        | Ser        | Lys<br>485 | asa        | · Leu        | Asp        | Phe               | Asn<br>490 | Asn        | Asn        | Ser               | Asn        | Phe<br>495                | Ala                |
| <i>35</i> | Trp        | Thr        | Ala        | Ala<br>500 | Thr        | Lys        | Tyr          | His        | Leu<br>505        | Asn        | Gly        | Arg        | Asn               | Ser<br>510 | Leu                       | The                |
|           | Asn        | ,<br>bro   | Gly<br>515 | Ile        | Pro        | Met        | Ala          | Thr<br>520 | aeA               | Lys        | Asp        | Asp        | Glu<br>525        | Asp        | Gln                       | Phe                |
| 40        | Phe        | Pro<br>530 | Ile        | Asn        | Gly        |            | Leu<br>535   | Val        | Phe               | Gly        | Lys        | Thr<br>540 | еĵà               | Ala        | Ala                       | Asn                |
| 45        | Lys<br>545 | Thr        | Thr        | Leu        | Glu        | Asn<br>550 | Val          | Leu        | Met               | Thr        | Ser<br>555 | Glu        | Glu               | Glu        | Ile                       | Lys<br>5 <b>60</b> |
|           | Thr        | Thr        | Asn        | Pro        | Val<br>565 | Ala        | Thr          | Glu        | Glu               | Tyr<br>570 | Gly        | Val        | Val               | Ser        | <b>Ser</b><br><b>57</b> 5 | Asn                |
| 50        | Leu        | Gln        | Ser        | Ser<br>580 | Thr        | Ala        | Gly          |            | <b>Gln</b><br>585 | Ser        | Gln        | Thr        | Ile               | Asn<br>590 | ser                       | Glņ                |
|           | Gly        |            | Leu<br>595 | Pro        | Gly        | Met        |              | Trp<br>600 | Gln               | Asn        | Arg .      | qeA        | <b>Val</b><br>605 | Tyr        | Leu                       | Gln                |

|                |                                              | Gly        | Pro<br>610 |            | Trp        | Ala        | Lys        | Ile<br>615 |            | His        | Thr        | Asp        | Gly<br>620 | Asn        | Phe        | His        | Pro        |
|----------------|----------------------------------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| 5 <sub>.</sub> |                                              | Ser<br>625 |            | Leu        | Met        | Gly        | Gly<br>630 |            | Gly        | Leu        | Lys        | His<br>635 |            | Pro        | Pro        | Gln        | Ile<br>640 |
| 10             |                                              | Leu        | Ile        | Lys        | Asn        | Thr<br>645 | Pro        | Val        | Pro        | Ala        | Asn<br>650 |            | Pro        | Glu        | Val        | Phe<br>655 |            |
| 15             |                                              | Pro        | Ala        | Lys        | Phe<br>660 | Ala        | Ser        | Phe        | Ile        | Thr<br>665 | Gln        | Tyr        | Ser        | Thr        | Gly<br>670 | Gln        | Val        |
|                |                                              | Ser        | Val        | Glu<br>675 | Ile        | Glu        | Trp        | Glu        | Leu<br>680 | Gln        | Lys        | Glu        | Asn        | Ser<br>685 | Lys        | Arg        | Trp        |
| 20             |                                              | Asn        | Pro<br>690 | Glu        | Ile        | Gln        | Tyr        | Thr<br>695 | Ser        | Asn        | Tyr        | Ala        | Lys<br>700 | Ser        | Asn        | Asn        | Val        |
| <i>25</i>      |                                              | Glu<br>705 | Phe        | Ala        | Val        | Asn        | Pro<br>710 | qeA        | Gly        | Val        | Tyr        | Thr<br>715 | Glu        | Pro        | Arg        | Pro        | Ile<br>720 |
|                |                                              | Gly        | Thr        | Arg        | Tyr        | Leu<br>725 | Thr        | Arg        | Asn        | Leu        |            |            |            |            |            |            |            |
| 30             | <210> 11<br><211> 73<br><212> PF<br><213> ca | 5<br>RT    | rotein     | of AA      | V serc     | otype,     | clone      | 42.6B      |            |            |            |            | •          |            |            |            |            |
| <b>35</b>      | <400> 11                                     | 2          |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |
| 40             |                                              |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |

|    | Met<br>1  | Ala       | Ala       | qeA        | Gly<br>5  | Tyr       | Leu       | Pro       | Asp        | Trp<br>10 | Leu       | Glu       | qeA       | Asn        | Leu<br>15 | Ser       |
|----|-----------|-----------|-----------|------------|-----------|-----------|-----------|-----------|------------|-----------|-----------|-----------|-----------|------------|-----------|-----------|
| 5  | Glu       | Gly       | Ile       | Arg<br>20  | Glu       | Trp       | Trp       | Asp       | Leu<br>25  | Lys       | Pro       | Gly       | Ala       | Pro<br>30  | Lys       | Pro       |
| 10 | Lys       | Ala       | Asn<br>35 | Gln        | Gln       | Lys       | Gln       | Asp<br>40 | qeA        | Gly       | Arg       | Gly       | Leu<br>45 | Val        | Leu       | Pro       |
|    | Gŀy       | Tyr<br>50 | Lys       | Tyr        | Leu       | Gly       | Pro<br>55 | Phe       | Asn        | Gly       | Leu       | Asp<br>60 | Lys       | Gly        | Glu       | Pro       |
| 15 | Val<br>65 | Asn       | Glu       | Ala        | Asp       | Ala<br>70 | Ala       | Ala       | Leu        | Glu       | His<br>75 | Asp       | Lys       | Ala        | Tyr       | Asp<br>80 |
| 20 | Lys       | Gln       | Leu       | Glu        | Gln<br>85 | Gly       | Asp       | Asn       | Pro        | Туг<br>90 | Leu       | Lys       | Tyr       | Asn        | His<br>95 | Ala       |
|    | Asp       | Ala       | Glu       | Phe<br>100 | Gln       | Glu       | Arg       | Leu       | Gln<br>105 | Glu       | qeA       | Thr       | Ser       | Phe<br>110 | ejly      | Gly       |
| 25 |           |           |           |            |           |           |           |           | -          |           |           |           |           |            |           |           |

|    |    |   |   | As         | sn Le        | u Gl<br>11   | y Ar       | g Al         | a Va       | l Ph        | e Gl:<br>120 |            | a Ly       | s Ly       | s Ar       | g Va.<br>12 |            | u Gli        | ı Pro        |
|----|----|---|---|------------|--------------|--------------|------------|--------------|------------|-------------|--------------|------------|------------|------------|------------|-------------|------------|--------------|--------------|
| 5  |    |   |   | Le         | eu Gl<br>13  | y Le<br>O    | u Vai      | l Gl         | u Gli      | u Gl;<br>13 |              | a Ly:      | s Th       | r Ala      | a Pro      |             | y Ly       | s Ly:        | a Arg        |
| 10 |    |   |   | Pr<br>14   | o Va<br>5    | l Gl         | u Pro      | o Se         | 2 Pro      |             | n Arg        | g Sei      | r Pr       | Ası<br>15  |            | r Sei       | r Thi      | ,<br>Gly     | / Ile<br>160 |
| 15 |    |   |   | Gl         | у Гу         | s Thi        | r Gly      | / Glr<br>165 | Glr        | n Pro       | Ala          | . Lys      | 170        |            | , Lei      | ı Ası       | n Phe      | e Gly<br>175 | Gln          |
| 15 |    |   |   | Th         | r Gly        | y Asp        | Ser<br>180 | Glu          | . Sez      | Val         | . Pro        | Asp<br>185 |            | Glr        | Pro        | lle         | Gly<br>190 |              | Pro          |
| 20 | •  |   |   | Pr         | o Ala        | a Gly<br>195 | Pro        | Ser          | Gly        | Leu         | Gly<br>200   |            | Gly        | Thr        | Met        | Ala<br>205  |            | Gly          | Gly          |
| 25 |    |   |   | Gl         | y Ala<br>210 | a Pro        | Met        | Ala          | qeA        | Asn<br>215  | Asn          | Glu        | Gly        | Ala        | Asp<br>220 |             | Val        | Gly          | Ser          |
|    |    |   |   | Sez<br>225 | s Ser        | Gly          | neA '      | Trp          | His<br>230 | Суз         | Asp          | Ser        | Thr        | Trp<br>235 |            | Gly         | Asp        | Arg          | Val<br>240   |
| 30 |    |   | * | Ιlϵ        | e Thr        | Thr          | Ser        | Thr<br>245   | Arg        | Thr         | Trp          | Ala        | Leu<br>250 | Pro        | Thr        | Tyr         | Asn        | Asn<br>255   | His          |
| 35 |    |   |   | Lev        | Tyr          | Lys          | Gln<br>260 | Ile          | Ser        | Asn         | Gly          | Thr<br>265 | Ser        | Gly        | Gly        | Ser         | Thr<br>270 | Asn          | Asp          |
|    |    |   |   | Asn        | Thr          | Tyr<br>275   | Phe        | Gly          | Tyr        | Ser         | Thr<br>280   | Pro        | Trp        | ejA        | Tyr        | Phe<br>285  | Asp        | Phe          | Asn          |
| 40 | ٠. |   |   | Arg        | Phe<br>290   | His          | Суя        | His          | Phe        | Ser<br>295  | Pro          | Arg        | Asp        | Trp        | Gln<br>300 | Arg         | Leu        | Ile          | Asn          |
| 45 | •  |   |   | neA<br>305 | Asn          | Trp          | Gly        | Phe          | Arg<br>310 | Pro         | Arg          | Lys        | Leu        | Arg<br>315 | Phe        | Lys         | Leu        | Phe          | Asn<br>320   |
|    |    | • |   | Ile        | Gln          | Val          | Lys        | Glu<br>325   | Val        | Thr         | Thr          | Asp        | qeA<br>088 | Gly        | Val        | Thr         | Thr        | Ile<br>335   | Ala          |
| 50 |    |   |   | Asn        | Asn          | Leu          | Thr<br>340 | Ser          | Thr        | Ile         |              | Val<br>345 | Phe        | Ser        | Asp        | Ser         | Glu<br>350 | Tyr          | Gln          |
| 55 |    |   |   | Leu        | Pro          | Tyr<br>355   | Val        | Leu          | Gly        |             | Ala :<br>360 | His        | Gln        | Gly        | Суз        | Leu<br>365  | Pro        | Pro          | Phe          |

|    |     | Pr         | o Al<br>37 | e.A. s<br>0 | p Va         | l Ph       | e Me       | t Il<br>37 | e Pr<br>5  | o Gl        | n Ty         | r Gl              | у Ту.<br>38  |            | u Th        | r Le               | u Asn        |
|----|-----|------------|------------|-------------|--------------|------------|------------|------------|------------|-------------|--------------|-------------------|--------------|------------|-------------|--------------------|--------------|
| 5  |     | As:        | n Gl;<br>5 | y Se.       | r Gl:        | n Se       | r Va<br>39 | 1 G1<br>0  | y Ar       | g Se        | r Se         | r Ph              | e Ty:        | г Су       | s Le        | u Gl               | u Tyr<br>400 |
| 10 |     | Pho        | e Pro      | o Sei       | r Gli        | n Me<br>40 | t Le       | u Ar       | g Thi      | r Gl        | y Ası<br>410 | n Ası<br>D        | Phe          | e Gli      | ı Phe       | 9 Se:              | r Tyr<br>5   |
|    |     | Thi        | r Phe      | e Glu       | 1 Gli<br>420 | ı Vai      | l Pr       | o Phe      | ≥ Hi:      | 3 Se<br>425 | r Sei        | туг               | Ala          | Hi:        | 3 Se<br>430 |                    | n Ser        |
| 15 |     | Lev        | ı Asp      | Arg<br>435  | Leu          | Met        | reA :      | n Pro      | 140        | ı Ile       | Asp          | Gln               | Туг          | Leu<br>445 |             | Тул                | Leu          |
| 20 |     | Ala        | Arg<br>450 | Thr         | Gln          | Ser        | Thr        | Thr<br>455 | Gly        | / Ser       | Thr          | Arg               | Glu<br>460   |            | Gln         | Phe                | His          |
| 25 |     | Gln<br>465 | Ala        | Gly         | Pro          | neA        | Thr<br>470 | Met        | Ala        | Glu         | Gln          | Ser<br>475        | Lys          | Asn        | Trp         | Leu                | Pro<br>480   |
| 25 |     | Gly        | Pro        | Суз         | Tyr          | Arg<br>485 | Gln        | Gln        | Arg        | Leu         | Ser<br>490   | Lys               | Asn          | Ile        | Asp         | <b>Ser</b><br>495  | Asn          |
| 30 |     | Asn        | Asn        | Ser         | Asn<br>500   | Phe        | Ala        | Trp        | Thr        | Gly<br>505  | Ala          | Thr               | Lys          | Tyr        | His<br>510  | Leu                | Asn          |
| 35 |     | Gly        | Arg        | Asn<br>515  | Ser          | Leu        | Thr        | Asn        | Pro<br>520 | Gly         | Val          | Ala               | Met          | Ala<br>525 | Thr         | Asn                | Lys          |
|    | ٠   | Asp        | Asp<br>530 | Glu         | Ąsp          | Gln        | Phe        | Phe<br>535 | Pro        | Ile         | Asn          | Gly               | Val<br>540   | Leu        | Val         | Phe                | Gly          |
| 40 |     | Lys<br>545 | Thr        | Gly         | Ala          | Ala        | Asn<br>550 | Lys        | Thr        | Thr         | Leu          | <b>Glu</b><br>555 | Asn          | Val        | Leu         | Met                | Thr<br>560   |
| 45 |     | Ser        | Glu        | Glu         | Glu          | Ile<br>565 | Lys        | Thr        | Thr        | Asn         | Pro<br>570   | Val               | Ala          | Thr        | Glu         | Glu<br><b>5</b> 75 | Tyr          |
|    |     | Gly        | Val        | Val         | Ser<br>580   | Ser        | Asn        | Leu        | Gln        | Ser<br>585  | Ser          | Thr               | Ala          | Gly        | Pro<br>590  | Gln                | Thr          |
| 50 |     | Gln        | Thr        | Val<br>595  | Asn          | Ser        | Gln        | Gly        | Ala<br>600 | Leu         | Pro          | Gly :             |              | Val<br>605 | Trp         | Gln                | Asn          |
| 55 | . • | Arg        | Asp<br>610 | Val         | Tyr          | Leu        | Gln        | Gly<br>615 | Pro        | Ile         | Trp .        |                   | Lys :<br>620 | Ile        | Pro         | His                | Thr          |

|    |         | As;<br>62:         | p Gl <sub>i</sub><br>5         | y Ası                          | n Phe                          | His                      | 630                      | Ser                  | Pro              | Leu                       | Met          | Asp<br>635      |                         | Phe                     | e Gly                          | y Le                    | 1 Lys<br>640 |
|----|---------|--------------------|--------------------------------|--------------------------------|--------------------------------|--------------------------|--------------------------|----------------------|------------------|---------------------------|--------------|-----------------|-------------------------|-------------------------|--------------------------------|-------------------------|--------------|
| 5  |         | Hi                 | s Pro                          | Pro                            | Pro                            | Gln<br>645               | Ile                      | . Leu                | Ile              | Lys                       | Asn<br>650   |                 | Pro                     | Val                     | Pro                            | 655                     | a Asn        |
| 10 |         | Pro                | Pro                            | Glu                            | Val<br>660                     | Phe                      | Thr                      | Pro                  | Ala              | Lys<br>665                |              | Ala             | Ser                     | Phe                     | : Ile<br>670                   |                         | Gln          |
|    |         | Tyr                | : Ser                          | Thr<br>675                     | Gly                            | Gln                      | Val                      | Ser                  | Val<br>680       | Glu                       | Ile          | Glu             | Trp                     | Glu<br>685              |                                | . Glr                   | Lys          |
| 15 |         | Glu                | Asn<br>690                     | Ser                            | Lys                            | Arg                      | Trp                      | Asn<br>695           | Pro              | Glu                       | Ile          | Gln             | Tyr<br>700              | Thr                     | Ser                            | Asn                     | Tyr          |
| 20 |         | Ala<br>705         | Lys                            | Ser                            | Asn                            | Asn                      | Val<br>710               | Glu                  | Phe              | Ala                       | Val          | Asn<br>715      | Asn                     | Glu                     | Gly                            | Val                     | Tyr<br>720   |
|    |         | Thr                | Glu                            | Pro                            | Arg                            | Pro<br>725               | Ile                      | Gly                  | Thr              | Arg                       | Tyr<br>730   | Leu             | Thr                     | Arg                     | Asn                            | Leu<br>735              |              |
| 25 | <210> 1 | 13                 |                                |                                |                                |                          |                          |                      |                  |                           |              |                 |                         |                         |                                |                         |              |
|    | <211> 6 |                    |                                |                                |                                |                          |                          |                      |                  |                           |              |                 |                         | •                       |                                |                         |              |
| 30 | <213> c |                    | proteir                        | of AA                          | V ser                          | otype,                   | clone                    | 42.12                |                  |                           | * **** *     | -               |                         |                         |                                |                         |              |
| 35 |         |                    |                                |                                |                                |                          |                          |                      |                  |                           |              |                 |                         |                         |                                |                         |              |
|    |         | Met<br>1           | Ala                            | Ala                            | Asp                            | Gly<br>5                 | Tyr                      | Leu                  | Pro              | Asp                       | Trp<br>10    | Leu             | Glu                     | Ąsp                     | Asn                            | Leu<br>15               | Ser          |
|    |         | 1                  |                                |                                |                                | 5                        |                          |                      | Asp              |                           | 10           |                 |                         |                         | Asn<br>Pro<br>30               | 15                      |              |
| 40 |         | Glu                | Gly                            | Ile                            | Arg<br>20                      | 5<br>Glu                 | Trp                      | Trp                  | Asp              | Leu<br>25                 | 10<br>Lys    | Pro             | ely                     | Ala                     | Pro                            | 15<br>Lys               | Pro          |
| 40 |         | Glu<br>Lys         | Gly                            | Ile<br>Asn<br>35               | Arg<br>20<br>Gln               | 5<br>Glu<br>Gln          | Trp<br>Lys<br>Gly        | Trp                  | Asp<br>Asp<br>40 | Leu<br>25<br>Asp          | lys<br>Gly   | Pro<br>Arg (    | Gly<br>Gly              | Ala<br>Leu<br>45        | Pro<br>30                      | 15<br>Lys<br>Leu        | Pro<br>Pro   |
|    |         | Glu<br>Lys<br>Gly  | Gly<br>Ala<br>Tyr<br>50        | Ile<br>Asn<br>35<br>Lys        | Arg<br>20<br>Gln<br>Tyr        | Glu<br>Gln<br>Leu<br>Asp | Trp<br>Lys<br>Gly        | Gln Pro              | Asp<br>Asp<br>40 | Leu<br>25<br>Asp          | Lys<br>Gly : | Pro<br>Arg (    | Gly<br>Gly<br>Asp:      | Ala<br>Leu<br>45<br>Lys | Pro<br>30<br>Val               | 15<br>Lys<br>Leu<br>Glu | Pro<br>Pro   |
|    |         | Glu Lys Gly Val 65 | Gly<br>Ala<br>Tyr<br>50<br>Asn | Ile<br>Asn<br>35<br>Lys<br>Glu | Arg<br>20<br>Gln<br>Tyr<br>Ala | Glu<br>Gln<br>Leu<br>Asp | Trp<br>Lys<br>Gly<br>Ala | Gln .<br>Pro .<br>55 | Asp<br>40<br>Phe | Leu<br>25<br>Asp<br>Asn ( | Lys Gly :    | Pro Arg ( Leu ; | Gly<br>Gly<br>Asp<br>60 | Ala<br>Leu<br>45<br>Lys | Pro<br>30<br>Val<br>Gly<br>Ala | Lys<br>Leu<br>Glu       | Pro Pro Asp  |

|           | Asn          | Leu        | Gly<br>115 |            | Ala        | Val        | Phe        | Gln<br>120 |            | Lys        | Lys        | Arg        | Val<br>125 |            | G) n       | Pro        |
|-----------|--------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| 5         | Leu          | Gly<br>130 |            | Val        | Glu        | Glu        | Gly<br>135 | Ala        | Lys        | Thr        | Ala        | Pro<br>140 | Gly        | Lys        | Lys        | Arg        |
| 10        | Pro<br>145   | Val        | Glu        | Pro        | Ser        | Pro<br>150 |            | Arg        | Ser        | Pro        | Asp<br>155 |            | Ser        | Thr        | Gly        | Ile<br>160 |
| 45        | Gly          | Lys        | Thr        | Gly        | Gln<br>165 | Gln        | Pro        | Ala        | Lys        | Lys<br>170 | Arg        | Leu        | Asn        | Phe        | Gly<br>175 |            |
| 15        | Thr          | Gly        | Asp        | Ser<br>180 | Glu        | Ser        | Val        | Pro        | Asp<br>185 |            | Gln        | Pro        | Ile        | Gly<br>190 | Glu        | Pro        |
| 20        | Pro          | Ala        | Gly<br>195 | Pro        | Ser        | GŢĀ        | Leu        | Gly<br>200 |            | Gly        | Thr        | Met        | Ala<br>205 | Ala        | Gly        | Gly        |
| 25        | Gly          | Ala<br>210 | Pro        | Met        | Ala        | Asp        | Asn<br>215 | neA        | Glu        | ely        | Ala        | Asp<br>220 | Gly        | Val        | Gly        | Ser        |
|           | . Ser<br>225 | Ser        | Gly        | Asn        | Trp        | His<br>230 | Cys        | qeA        | Ser        | Thr        | Trp<br>235 | Leu        | Gly        | Asp        | Arg        | Val<br>240 |
| 30        | Ile          | Thr        | Thr        | Ser        | Thr<br>245 | Arg        | Thr        | Trp        | Ala        | Leu<br>250 | Pro        | Thr        | Tyr        | Asn        | Asn<br>255 | His        |
| <i>35</i> | Leu          | Tyr        | Lys        | Gln<br>260 | Ile        | Ser        | Asn        | Gly        | Thr<br>265 | Ser        | GJY        | Gly        | Ser        | Thr<br>270 | Asn        | Asp        |
|           | _Asn         | Thr        | Tyr<br>275 | Phe        | Gly        | Tyr        | Ser        | Thr<br>280 | .bro       | Trp        | elà        | Tyr        | Phe<br>285 | Asp        | Phe        | Asn        |
| 40        | Arg          | Phe<br>290 | His        | Суз        | His        | Phe        | Ser<br>295 | Pro        | Arg        | qeA        | Trp        | Gln<br>300 | Arg        | Leu        | Ile        | Asn        |
| 45        | Asn<br>305   | Asn        | Trp        | Gly        | Phe        | Arg<br>310 | Pro        | Lys        | Arg        | Leu        | Asn<br>315 | Phe        | Lys        | Leu        | Phe        | Asn<br>320 |
|           | Ile          | Gln        | Val        | Lys        | Glu<br>325 | Val        | Thr        | Gln        | Asn        | Glu<br>330 | Gly        | Thr        | ГÀЗ        | Thr        | Ile<br>335 | Ala        |
| 50        | Asn          | Asn        | Leu        | Thr<br>340 | Ser        | Thr        | Ile        | Gln        | Val<br>345 | Phe        | Thr        | Asp        | Ser        | Glu<br>350 | Tyr        | Gln        |
| 55        | Leu          | Pro        | Tyr<br>355 | Val        | Leu        | ely        | Ser        | Ala<br>360 | His        | Gln        | Gly        | Суз        | Leu<br>365 | Pro        | Pro        | Phe        |

| 5         | Pro        | 370        | Asp        | Val        | . Phe      | : Met      | 375        |            | Gln        | туг        | . el?      | 7 Ty:<br>380 |            | 1 Th:      | Leu               | a Asr        |
|-----------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|--------------|------------|------------|-------------------|--------------|
| J         | Asn<br>385 | Gly        | Ser        | Gln        | Ala        | Val<br>390 |            | ' Arg      | Ser        | Ser        | Phe 395    |              | : Cys      | Lev        | . Glu             | 1 Tyr<br>400 |
| 10        | Phe        | Pro        | Ser        | Gln        | Met<br>405 |            | ı Arg      | Thr        | Gly        | Asn<br>410 |            | Phe          | Glu        | Phe        | Ser<br>415        |              |
| 15        | Gln        | Phe        | Glu        | Asp<br>420 | Val        | Pro        | Phe        | His        | Ser<br>425 |            | Tyr        | Ala          | His        | Ser<br>430 | Gln               | Ser          |
|           | Leu        | Asp        | Arg<br>435 |            | Thr        | Asn        | Pro        | Leu<br>440 |            | Asp        | Gln        | Tyr          | Leu<br>445 |            | Tyr               | Leu          |
| 20        | Ala        | Arg<br>450 | Thr        | Gln        | Ser        | Thr        | Thr<br>455 | Gly        | Ser        | Thr        | Arg        | Gly<br>460   | Leu        | Gln        | Phe               | His          |
| 25        | Gln<br>465 | Ala        | Gly        | Pro        | Asn        | Thr<br>470 | Met        | Aļa        | Glu        | Gln        | Ser<br>475 | Lys          | neA        | Trp        | Leu               | Pro<br>480   |
| •         | Gly        | Pro        | Суз        | Tyr        | Arg<br>485 | Gln        | Gln        | Arg        | Leu        | Ser<br>490 | Lys        | Asn          | Ile        | Asp        | Ser<br>495        | Asn          |
| 30        | Asn        | Asn        | Ser        | Asn<br>500 | Phe        | Ala        | Trp        | Thr        | Gly<br>505 | Ala        | Thr        | Lys          | Tyr        | His<br>510 | Leu               | Asn          |
| 35        | Gly        | Arg        | Asn<br>515 | Ser        | Leu        | Thr        | neA        | Pro<br>520 | Gly        | Val        | Ala        | Met          | Ala<br>525 | Thr        | Asn               | Lys          |
|           |            | Asp<br>530 | Glu        | qeA        | Gln        | Phe        | Phe<br>535 | Pro        | Ile        | Asn        | Gly        | Val<br>540   | Leu        | Val        | Phe               | Gly          |
| 40        | Lys<br>545 | Thr        | Gly        | Ala        | Ala        | Asn<br>550 | Lys        | Thr        | Thr        | Leu        | Glu<br>555 | Asn          | Val        | Leu        | Met               | Thr<br>560   |
| 45        | Ser        | Glu        | Glu        | Glu        | Ile<br>565 | Lys        | Thr        | Thr        | Asn        | Pro<br>570 | Val        | Ala          | Thr        | Glu        | <b>Glu</b><br>575 | Tyr          |
|           | Gly '      | Val        | Val        | Ser<br>580 | Ser        | Asn        | Leu        | Gln        | Ser<br>585 | Ser        | Thr        | Ala          | ely        | Pro<br>590 | Gla               | Thr          |
| <i>50</i> | Gln '      |            | Val<br>595 | Asn        | Ser        | Gln        | Gly        | Ala<br>600 | Leu        | Pro        | Gly        | Met          | Val<br>605 | Trp        | Gln               | Asn          |
| 55        | Arg i      | Asp<br>610 | Val        | Tyr        | Leu        | Gln        | Gly<br>615 | Pro        | Ile        | Trp        |            | Lys<br>620   | Ile        | Pro        | His               | Thr          |

|    |                                                 |        |             |            |            |                  | _      | .r 13        | 10 5/      | 1 81       |            |      |      |            |            |            |      |
|----|-------------------------------------------------|--------|-------------|------------|------------|------------------|--------|--------------|------------|------------|------------|------|------|------------|------------|------------|------|
|    |                                                 | geA    | Glv         | Asn        | Phe        | His              | Pro    | Ser          | Pro        | T.eu       | Met        | G) v | G) v | Phe        | G) v       | Leu        | T.Ve |
|    |                                                 | 625    | ,           |            |            |                  | 630    |              |            | 202        | Met        | 635  | Cly  | * 110      | GIY        | neu        | 640  |
| 5  |                                                 | His    | Pro         | Pro        | Pro        | Gln<br>645       | Ile    | Leu          | Ile        | Гуз        | Tyr<br>650 | Thr  | Ser  | Asn        | Tyr        | Tyr<br>655 | Lys  |
| 10 |                                                 | 'Ser   | Thr         | Asn        | Val<br>660 | Asp              | Phe    | Ala          | Val        | Asn<br>665 | Thr        | Glu  | Gly  | Thr        | Tyr<br>670 | Ser        | Glu  |
|    |                                                 | Pro    | Arg         | Pro<br>675 | Ile        | Gly              | Thr    | Arg          | Tyr<br>680 | Leu        | Thr        | Arg  | Asn  | Leu<br>685 |            |            |      |
| 15 |                                                 |        |             |            | •          |                  |        |              |            |            |            |      |      |            |            |            |      |
| 20 | <210> 114<br><211> 724<br><212> PR<br><213> cap | ‡<br>T | ntein o     | f ΔΔ\/     | seroti     | vne ci           | ione A | <b>Δ</b> V5C | ΔĐ         |            |            |      |      |            |            |            |      |
|    | <400> 114                                       |        | · · · · · · | ,,,,,,     |            | у <b>р</b> с, с. |        | AV00         | Λι         |            |            |      |      |            |            |            |      |
| 25 |                                                 |        |             |            |            |                  |        |              |            |            |            |      |      |            |            | -          |      |
|    |                                                 |        |             |            |            |                  |        |              |            |            |            |      |      |            |            |            |      |
| 30 |                                                 |        |             |            |            | -                |        |              |            |            |            |      |      |            |            |            |      |
|    |                                                 |        |             |            |            |                  |        |              |            |            |            |      |      |            |            |            |      |
|    |                                                 |        |             |            |            |                  |        |              |            |            |            |      |      |            |            |            |      |

|            | Met<br>1   | Ser        | Phe        | Val        | Asp<br>5   | His        | Pro        | Pro              | Asp        | Trp<br>10  | Leu              | Gli        | Glu        | (Va)       | 1 Gly<br>15 | / G1       |
|------------|------------|------------|------------|------------|------------|------------|------------|------------------|------------|------------|------------------|------------|------------|------------|-------------|------------|
| 5          | Gly        | Leu        | Arg        | Glu<br>20  | Phe        | Leu        | Gly        | Leu              | Glu<br>25  | . Ala      | Gly              | Pro        | Pro        | Lys        | Pro         | Lys        |
| 10         | Pro        | Asn        | Gln<br>·35 | Gln        | His        | Gln        | Asp        | Gln<br>40        | Ala        | Arg        | Gly              | Leu        | Val<br>45  | Leu        | Pro         | Gl         |
| •          | Tyr        | Asn<br>50  | Tyr        | Leu        | Gly        | Pro        | Gly<br>55  | Asn              | Gly        | Leu        | Asp              | Arg<br>60  | Gly        | Glu        | Pro         | Va]        |
| 15         | Asn<br>65  | Arg        | Ala        | Asp        | Glu        | Val<br>70  | Ala        | Arg              | Glu        | His        | <b>Asp</b><br>75 | Ile        | Ser        | Tyr        | aeA         | G11<br>80  |
| 20         | Gln        | Leu        | €]π        | Ala        | Gly<br>85  | Asp        | Asn        | Pro              | Tyr        | Leu<br>90  | Lys              | Tyr        | Asn        | His        | Ala<br>95   | qeA        |
|            | Ala        | Glu        | Phe        | Gln<br>100 | Glu        | Lys        | Leu        | Ala              | Asp<br>105 | Asp        | Thr              | Ser        | Phe        | Gly<br>110 | Gly         | Asn        |
| <b>2</b> 5 | Leu        | Gly        | Lys<br>115 | Ala        | Val        | Phe        | Gln        | Ala<br>120       | Lys        | Lys        | Arg              | Val        | Leu<br>125 | Glu        | Pro         | Phe        |
| 30         | Gly        | Leu<br>130 | Val        | Glu        | Glu        | Gly        | Ala<br>135 | Lys              | Thr        | Ala        | Pro              | Thr<br>140 | Gly        | Lys        | Arg         | Ile        |
|            | Asp<br>145 | Asp        | His        | Phe        | Pro        | Lys<br>150 | Arg        | Lys              | Lys        |            | Arg<br>155       | Thr        | Glu        | Glu        | Asp         | Ser<br>160 |
| <b>.</b>   | Lys        | Pro        | Ser        | Thr        | Ser<br>165 | Ser.       | Asp        | Ala <sub>,</sub> | Glu        | Ala<br>170 | Glу              | Pro        | Ser        | Gly        | Ser<br>175  | Gln        |

| _    |     | Glr        | . Let      | ı Glr      | 180        | Pro        | ) Ala      | a Glr      | 1 Pro      | 185        | a Sez      | s Se       | r Leu      | 1 GJ)      | / Ala<br>190 |            | Th         | :                           |
|------|-----|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|--------------|------------|------------|-----------------------------|
| 5    |     | Met        | Ser        | Ala<br>195 | ely        | , Gl       | / Gly      | , el?      | Pro<br>200 | Leu        | ı Gly      | zeA y      | reA c      | 205        |              | el)        | / Ala      | L                           |
| 10   | •   | Asp        |            | val        | . Gly      | Asn        | Ala        | Ser<br>215 |            | Asp        | Trp        | Hi:        | 220        |            | . Ser        | Thr        | Trp        | •                           |
| 15   |     | Met<br>225 |            | dsY.       | Arg        | Val        | Val<br>230 | Thr        | Lys        | Ser        | Thr        | 235        |            | Trp        | Val          | Leu        | Pro<br>240 |                             |
| 7.5  |     | Ser        | Tyr        | Asn        | . Asn      | His<br>245 |            | Tyr        | Arg        | Glu        | Ile<br>250 |            | Ser        | Gly        | Ser          | Val<br>255 |            |                             |
| 20   |     | Gly        | Ser        | Asn        | Ala<br>260 | Asn        | Ala        | Tyr        | Phe        | Gly<br>265 |            | Ser        | Thr        | Pro        | Trp<br>270   |            | Tyr        |                             |
| 25   |     | Phe        | qeA        | Phe<br>275 | Asn        | Arg        | Phe        | His        | Ser<br>280 | His        | Trp        | Ser        | Pro        | Arg<br>285 | qeA          | Trp        | Gln        | ,                           |
|      | ٠.۶ | Arg        | Leu<br>290 | Ile<br>(A) | Asn        | Asn        | Tyr        | Trp<br>295 | Gly        | Phe        | Arg        | Pro        | Arg<br>300 | Ser        | Leu          | Arg        | Vaļ        | بالأكبيل أرابي وتفيش مهايتك |
| 30   |     | Lys<br>305 | Ile        | Phe        | Asn        | Ile        | Gln<br>310 | Val        | Lys        | Glu        | Val        | Thr<br>315 |            | Gln        | Asp          | Ser        | Thr<br>320 |                             |
| 35 1 |     | Thr'       | Thr        | Ile        | Ala        | Asn<br>325 | Asn        | Leu        | Thr        | Ser        | Thr<br>330 | Val        | Gln        | Val        | Phe          | Thr<br>335 | Asp        |                             |
|      |     | qeA        | qeA        | Tyr        | Gln<br>340 | Leu        | Pro        | Tyr        | Vai        | Val<br>345 | Gly        | Asn        | Gly        | Thr        | Glu<br>350   | Gly        | Суз        |                             |
| 40   |     | Leu        | Pro        | Ala<br>355 | Phe        | Pro        | Pro        | Gln        | Val<br>360 | Phe        | Thr        | Leu        | Pro        | Gln<br>365 | Tyr          | elà        | Tyr        |                             |
| 45   |     | Ala        | Thr<br>370 | Leu        | Asn        | Arg        | Asp        | Asn<br>375 | Thr        | Glu        | Asn        | Pro        | Thr<br>380 | Glu        | Arg          | Ser        | Ser        | :                           |
|      |     | Phe<br>385 | Phe        | Суз        | Leu        | Glu        | Tyr<br>390 | Phe        | Pro        | Ser        | Lys        | Met<br>395 | Leu        | Arg        | Thr          | Gly        | Asn<br>400 |                             |
| 50   |     | neA        | Phe        | Glu        | Phe        | Thr<br>405 | Tyr        | Asn        | Phe        |            | Glu<br>410 | Val        | Pro        | Phe        | His          | Ser<br>415 | Ser        |                             |
| 55   | ;   | Phe        | Ala        |            | Ser<br>420 | Gln        | neA        | Leu        |            | Lys<br>425 | Leu        | Ala        | asA        | Pro        | Leu<br>430   | Val        | Asp        |                             |

|            |   | Gln        | Tyr        | Leu<br>435 |            | Arg        | Phe        | Val        | Ser<br>440 |            | neA:       | neA ,      | Thr        | Gly<br>445 |            | / Val             | . Gli           |
|------------|---|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|-------------------|-----------------|
| 5          |   | Phe        | 450        |            | Asn        | Leu        | Ala        | Gly<br>455 |            | Ty:        | , Ala      | Asn        | Thr<br>460 |            | Lys        | Asn               | Tr              |
| 10         |   | Phe<br>465 |            | Gly        | Pro        | Met        | Gly<br>470 |            | Thr        | Gln        | Gly        | Trp<br>475 |            | Leu        | Gly        | ' Ser             | G1 <sub>3</sub> |
| 15         |   | Val        | Asn        | Arg        | Ala        | Ser<br>485 |            | Ser        | Ala        | Phe        | Ala<br>490 |            | Thr        | Asn        | Arg        | Met<br>495        |                 |
| 15         |   | Leu        | Glu        | Gly        | Ala<br>500 | Ser        | Tyr        | Gln        | Val        | Pro<br>505 |            | Gln        | Pro        | Asn        | Gly<br>510 | Met               | - Thr           |
| 20         |   | Asn        | Asn        | Leu<br>515 | Gln        | Gly        | Ser        | Asn        | Thr<br>520 | Tyr        | Ala        | Leu        | Glu        | Asn<br>525 | Thr        | Met               | Ile             |
| 25         |   | Phe        | Asn<br>530 | Ser        | Gln        | Pro        | Ala        | Asn<br>535 | Pro        | Gly        | Thr        | Thr        | Ala<br>540 | Thr        | Tyr        | Leu               | Glu             |
|            |   | Gly<br>545 |            | Met        | Leu        | Ile        | Thr<br>550 | Ser        | Glu        | Ser        | Glu        | Thr<br>555 | Gln        | Pro        | Val        | Asn               | Arg<br>560      |
| 30         |   | Val        | Ala        | Tyr        | Asn        | Val<br>565 | Gly        | Gly        | Gln        | Met        | Ala<br>570 | Thr        | Asn        | aeA        | Gln        | Ser<br>575        | Ser             |
| 35         |   | Thr        | Thr        | Ala        | Pro<br>580 | Ala        | Thr        | Gly        | Thr        | Tyr<br>585 | Asn        | Leu        | Gln        | Glu        | Ile<br>590 | Val               | Pro             |
| •          |   | Gly        | Ser        | Val<br>595 | Trp        | Met        | G]u        | Arg        | Asp<br>600 | Val        | Tyr        | Leu        | Gln        | Gly<br>605 | Pro        | Ile               | Trp             |
| 40         |   | Ala        | Lys<br>610 | Ile        | Pro        | Glu        | Thr        | Gly<br>615 | Ala        | His        | Phe        | His        | Pro<br>620 | Ser        | Pro        | Ala               | Met             |
| 45         |   | Gly<br>625 | Gly        | Phe        | Gly        | Leu        | Lys<br>630 | His        | Pro        | Pro        | Pro        | Met<br>635 | Met        | Leu        | Ile        | Lys               | Asn<br>640      |
|            |   | Thr        | Pro        | Val        | Pro        | Gly<br>645 | Asn        | Ile        | Thr        | Ser        | Phe<br>650 | Ser        | Asp        | Val        | Pro        | <b>Val</b><br>655 | Ser             |
| <b>50</b>  | • | Ser        | Phe        | Ile        | Thr<br>660 | Gln        | Tyr        | Ser        | Thr        | Gly<br>665 | Gln        | Val        | Thr        | Val        | Glu<br>670 | Met               | Glu             |
| <b>5</b> 5 |   | Trp        | Glu        | Leu<br>675 | Lys        | Lys        | Glu        | Asn        | Ser<br>680 | Lys        | Arg        | Trp        | Asn        | Pro<br>685 | Glu        | Ile               | Gln             |

|      | Tyr Thr Asn Asn Tyr Asn Asp Pro Gln Phe Val Asp Phe Ala Pro Asp<br>690 695 700     |     |
|------|------------------------------------------------------------------------------------|-----|
| 5    | Ser Thr Gly Glu Tyr Arg Thr Thr Arg Pro Ile Gly Thr Arg Tyr Leu<br>705 710 715 720 |     |
| 10   | Thr Arg Pro Leu                                                                    |     |
| 15 · | <210> 115 <211> 9 <212> DNA <213> DrallI restriction enzyme site                   |     |
|      | <400> 115                                                                          |     |
| 20   | caccacgtc                                                                          | 9   |
| 25   | <210> 116<br><211> 28<br><212> DNA<br><213> AV2cas                                 |     |
| 30   | <400> 116                                                                          |     |
|      | cgcagagacc aaagttcaac tgaaacga                                                     | 28  |
| 35   | 2040- 447                                                                          |     |
|      | <210> 117<br><211> 255<br><212> DNA                                                |     |
| 40   | <213> adeno-associated virus serotype 10                                           |     |
|      | <400> 117                                                                          |     |
|      | ggtaatteet ceggaaattg geattgegat tecacatgge tgggegacag agteateace                  | 60  |
| 15   | accagcacco gaacctgggt cotgoccaco tacaacaaco acatotacaa gcaaatotec                  | 120 |
|      | agegagacag gagecaccaa egacaaccae taettegget acageaccee etgggggtat                  | 180 |
| -0   | tttgacttta acagattcca ctgccacttt tcaccacgtg actggcagcg actcatcaac                  | 240 |
| 50   | aacaactggg gattc                                                                   | 255 |
| 55   | <210> 118 <211> 258 <212> DNA <213> adeno-associated virus serotype 11             |     |

<400> 118

|    | ggtaatteet ceggaaattg geattgegat tecacatgge tgggegacag agteateace | 60  |
|----|-------------------------------------------------------------------|-----|
| 5  | accagcaccc gaacctgggc cctgccaacc tacaacaacc acctctacaa acaaatctcc | 120 |
| ,  | agogottoaa ogggggocag caacgacaac cactactttg gotacagcac cocctggggg | 180 |
| 10 |                                                                   |     |
| 10 | tattttgact ttaacagatt ccactgccac ttctcaccac gtgactggca gcgactcatc | 240 |
|    | aacaaca ggggattc                                                  | 258 |
| 15 | <210> 119                                                         |     |
|    | <211> 255                                                         |     |
|    | <212> DNA                                                         |     |
|    | <213> adeno-associated virus serotype 12                          |     |
| 20 | <400> 119                                                         |     |
|    | ggtaatteet ceggaaattg geattgegat tecacatgge tgggegaceg agteattace | 60  |
| 25 | accageacce ggaettggge cetgeceace tacaacaace acetetacaa gcaaatetee | 120 |
|    | agccaatcgg gtgccaccaa cgacaaccac tacttcggct acagcacccc ttgggggtat | 180 |
|    | tttgatttca acagattcca ctgccatttc tcaccacgtg actggcagcg actcatcaac | 240 |
| 30 | aacaactggg gattc                                                  | 255 |
|    | <210> 120                                                         |     |
|    | <211> 2205                                                        |     |
|    | <212> DNA                                                         |     |
| 35 | <213> adeno-associated virus serotype, clone A3.1vp1 .            |     |
|    | <400> 120                                                         |     |
|    |                                                                   |     |

| atggctgccg | atggttatct | tccagattgg | ctcgaggaca | ctctctctga | aggaatcaga | 60   |
|------------|------------|------------|------------|------------|------------|------|
| cagtggtgga | agctcaaacc | tggcccacca | ccgccgaaac | ctaaccaaca | acaccgggac | 120  |
| gacagtaggg | gtcttgtgct | tcctgggtac | aagtacctcg | gacccttcaa | cggactcgac | 180  |
| aaaggagagc | cggtcaacga | ggcagacgcc | gcggccctcg | agcacgacaa | agcctacgac | 240  |
| caccagetea | agcaagggga | Caacccgtac | ctcaaataca | accacgcgga | cgctgaattt | 300  |
| caggagcgtc | ttcaagaaga | tacgtctttc | gggggcaacc | tcgggcgagc | agtcttccag | 360  |
| gccaaaaaga | gggtactcga | gcctcttggt | ctggttgagg | aagctgttaa | gacggeteet | 420  |
| ggaaaaaaga | gacctataga | gcagtctcct | gcagaaccgg | actetteete | gggcatcggc | 480  |
| aaatcaggcc | agcagcccgc | taagaaaaga | ctcaattttg | gtcagactgg | cgacacagag | 540  |
| tcagtcccag | accctcaacc | aatcggagaa | cccccgcag  | cecectatgg | tgtgggatct | 600  |
| aatacaatgg | cttcaggcgg | tggggcacca | atggcagaca | ataacgaagg | cgccgacgga | 660  |
| gtgggtaatt | cctcgggaaa | ttggcattgc | gattccacat | ggatgggcga | cagagttatc | 720  |
| accaccagca | caagaacctg | ggccctcccc | acctacaata | atcacctcta | caagcaaatc | 780  |
| tccagcgaat | cgggagccac | caacgacaac | cactacttcg | gctacagcac | cccctggggg | 840  |
| tattttgact | ttaacagatt | ccactgtcac | ttctcaccac | gtgactggca | gcgactcatc | 900  |
|            |            | acccaagaaa |            |            |            | 960  |
|            |            | tggaaccacg |            |            |            | 1020 |

|    | caggtette  | a cagactctga | gtaccageto | g ccctacgtco | teggttegge | tcaccagggc              | 1080  |
|----|------------|--------------|------------|--------------|------------|-------------------------|-------|
| 5  | tgccttccg  | cgttcccago   | agacgtcttc | atgattcct    | agtacggcta | cttgactctg              | 1140  |
| •  | aacaatggc  | a gccaagcggt | aggacgttct | tcattctact   | gtctagagta | ttttccctct              | 1200  |
|    | cagatgctga | a ggacgggaaa | caacttcacc | ttcagctaca   | cttttgaaga | cgtgcctttc              | 1260  |
| 10 | cacagcagct | acgcgcacag   | ccagagtctg | gatcggctga   | tgaatcctct | cattgaccag              | 1320  |
|    | tacctgtatt | acctgagcaa   | aactcagggt | acaagtggaa   | caacgcagca | atcgagactg              | 1380  |
|    | cagttcagco | aagctgggcc   | tagctccatg | gctcagcagg   | ccassasctg | gctaccggga              | 1440  |
| 15 | cccagctacc | gacagcagcg   | aatgtctaag | acggctaatg   | acaacaacaa | cagtgaattt              | 1500  |
|    | gcttggactg | cagccaccaa   | atattacctg | aatggaagaa   | attctctggt | caatcccggg              | 1560  |
|    | ccccaatgg  | ccagtcacaa   | ggacgatgag | gaaaagtatt   | tccccatgca | cggaaatctc              | 1620  |
| 20 | atctttggaa | aacaaggcac   | aggaactacc | aatgtggaca   | ttgaatcagt | gcttattaca              | 1680  |
|    | gacgaagaag | aaatcagaac   | aactaatcct | gtggctacag   | aacaatacgg | acaggttgcc              | 1740  |
|    | accaaccatc | agagtcagaa   | caccacagct | tcctatggaa   | gtgtggacag | ccagggaatc              | 1800  |
| 25 | ttacctggaa | tggtgtggca   | ggaccgcgat | gtctatcttc   | aaggtcccat | ttgggccaaa              | 1860  |
| ٠  | actecteaca | cggacggaca   | ctttcatcct | tctccgctca   | tgggaggctt | tggactgaaa              | 1920  |
|    | caccctcctc | cccagatect   | gatcaaaaac | acacctgtgc   | cagcgaatcc | cgcgaccact              | 1980  |
| 30 | ttcactcctg | gaaagtttgc   | ttogttcatt | acccagtatt   | ccaccggaca | ggtcagcgtg              | 2040  |
|    | gaaatagagt | gggagctgca   | gaaagaaaac | agcaaacgct   | ggaacccaga | aattcagt <del>a</del> c | .2100 |
|    |            | acaacaagtc   |            |              |            | cggtgtttat              | 2160  |
| 35 | tctgaacccc | gccctattgg   | cactcgttac | cttacccgga   | acttq      |                         | 2205  |

#### 40 Claims

45

50

- 1. A method of identifying unknown adeno-associated virus (AAV) sequences in a sample suspected of containing AAV from a latent infection, said method comprising the steps of:
  - (a) subjecting the sample containing DNA to amplification via polymerase chain reaction (PCR) using a first set of primers which specifically amplify a first AAV region comprising at least 250 bp of AAV capsid nucleic acid sequences, said first region having a variable sequence flanked by at least 18 base pairs of highly conserved sequence at its 5' end and at least 18 base pairs of highly conserved sequence at its 3' end, said base pairs being highly conserved relative to an alignment of at least AAV1, AAV2, AAV3, AAV4, AAV5 and AAV6;
  - (b) optionally subjecting the DNA to further amplification using a second set of primers which specifically amplify a second region which comprises the first region of AAV sequences and sequences which are 5' to the first region, such that AAV 5' extension sequences which anneal to the 5' end of the AAV sequences amplified by the primers for the first region are obtained;
  - (c) optionally subjecting the DNA to further amplification using a third set of primers which specifically amplify a third region which comprises the first region of AAV sequences and sequences which are 3' to the first region, such that AAV 3' extension sequences which anneal to the 3' end of the AAV sequences amplified by the primers for the first region are obtained,

each of said second and third regions being predetermined based upon the alignment of the nucleic acid sequences of at least AAV1, AAV2, AAV3. AAV4, AAV5 and AAV6, and each of said regions comprising nucleic acid sequences which are highly conserved over at least 18 base pairs at the 5' end, optionally variable sequences in the middle, and sequences which are highly conserved over at least 18 base pairs at the 3' end of the sequences of the region, relative to the sequences of at least AAV1, AAV2, AAV3, AAV4, AAV5 and AAV6; and each of the sets of primers consisting of a 5' primer and a 3' primer; the presence of amplified sequences indicating the presence of an AAV in the sample, and a comparison of differences between the amplified sequences and the sequences of AAV1, AAV2, AAV3, AAV4, AAV5 and AAV6 indicating the presence of an unknown AAV.

10

5

2. A method according to claim 1, wherein the comparison comprises the step of comparing restriction enzyme patterns for the amplified sequences to restriction enzyme patterns of AAV1, AAV2, AAV3, AAV4, AAV5 and AAV6.

A method according to claim 1 or claim 2, wherein step (a) amplifies the full-length capsid gene.

15

4. A method according to any of claims 1 to 3, wherein the amplified sequences comprise the AAV capsid gene and the AAV rep gene.

20

5. A method according to any of claims 1 to 4, wherein the DNA has been extracted from cells, cell culture, tissue, tissue culture or biological fluids.

6. A method according to any of claims 1 to 5, wherein the first region is highly conserved over at least about 25 base pairs at the 5' end of the region, the 3' end of the region or both.

25

7. A method according to claim 6, wherein the first region is highly conserved over at least about 30 base pairs at the 5' end of the region, the 3' end of the region or both.

30

8. A method according to any of claims 1 to 7, wherein the highly conserved sequences of the first region have at least 80% identity among the aligned AAVs at the 5' end of the region, the 3' end of the region or both.

9. A method according to claim 8, wherein the highly conserved sequences of the first region have at least 90% identity among the aligned AAVs at the 5' end of the region, the 3' end of the region or both.

35

10. A method according to any of claims 1 to 9, wherein the variable sequences in the middle of the first region have less than 70% identity among the aligned AAVs.

11. A method according to any of claims 1 to 10, wherein the first region spans about bp 2800 to about 3200 of AAV 1, SEQ ID NO:6, and corresponding base pairs in other AAVs.

40

ID NO:6, and corresponding base pairs in other AAVs. 13. A method according to any of claims 1 to 5, wherein the primers axe AV1ns, having the sequence ofnncleotides

12. A method according to claim 11, wherein the first region is 257 bp spanning bp 2886 to about 3143 of AAV 1, SEQ

14. A method according to claim 1 or claim 2, wherein the first set of primers allows isolation of full-length adeno-associated virus capsid sequences from a sample,

the first set of primers comprising a 5' primer directed to a region located in the middle of an AAV rep gene, based on a predetermined conserved region, and a 3' primer directed to a region downstream of an AAV cap gene, based on a predetermined conserved region of AAV.

50

15. A method according to any of claims 1 to 14, wherein the sample comprises AAV integrated into the chromosome.

16. A method according to any of claims 1 to 15, wherein the sample comprises human tissue.

17. A method according to any of claims 1 to 16, wherein the sample contains proviral AAV sequences.

1398 to 1423 of SEQ ID NO:6, and AV2cas, having the sequence of SEQ ID NO:7.

55

18. A method according to any of claims 1 to 17, wherein the first region is a signature region.

- 19. A method according to any of claims 1 to 18, wherein the base pairs of the highly conserved sequences are highly conserved relative to an alignment of AAVs 1,2,3,4,5 and 6 and AAVs isolated from geese and ducks.
- 20. A method according to any of claims 1 to 19, wherein the variable sequence is a hypervariable sequence.

10

15

20

25

30

40

- 21. A method according to any of claims 1 to 20, wherein the first region comprises up to 10 kilobasepairs in length.
- 22. A method according to claim 21, wherein the first region comprises a 3-1 kilobase pair fragment comprising the full-length cap sequence.
- 23. A kit for detecting the presence of an unknown adeno-associated virus (AAV) in a sample from cellular DNA suspected of containing a latent AAV infection, said kit comprising:
  - (a) a first set of primers which specifically amplify a first region comprising 250 bp of AAV capsid nucleic acid sequences, said first region having at least 18 base pairs of highly conserved sequence at its 5' end, a variable sequence, and at least 18 base pairs of highly conserved sequence at its 3' end, said base pairs being highly conserved relative to an alignment of at least AAV1, AAV2, AAV3, AAV4, AAV5 and AAV6;
  - (b) optionally a second set of primers specific for a second region of the AAV nucleic acid sequences which comprises the first region of AAV sequences and sequences which are 5' to the first region, such that AAV 5' extension sequences which anneal to the 5' end of the AAV sequences amplified by the primers for the first region are obtained;
  - (c) optionally a third set of primers which specifically amplify a third region which comprises the first region of AAV sequences and sequences which are 3' to the first region, such that AAV 3' extension sequences which anneal to the 3' end of the AAV sequences amplified by the primers for the first region are obtained;

each of said second and third regions being predetermined based upon the alignment of the nucleic acid sequences of at least AAV1, AAV2, AAV3, AAV4, AAV5 and AAV6, and each of said regions comprising nucleic acid sequences which are highly conserved over at least 18 base pairs at the 5' end, optionally variable sequences in the middle, and sequences which are highly conserved over at least 18 base pairs at the 3' end of the sequences of the region, relative to the sequences of at least AAV1, AAV2, AAV3, AAV4, AAV5 and AAV6; each of the sets of primers consisting of a 5' primer and a 3' primer, each of said primers comprising at least 15 nucleotides complementary to its respective highly conserved sequence and having exact identity with its respective highly conserved sequence over at least 5 base pairs in its 3' end.

- 24. A kit according to claim 23, wherein the 5' primer and/or the 3' primer comprises at least 18 nucleotides.
  - 25. A kit according to claim 24, wherein the 5' primer and/or the 3' primer comprises 25 nucleotides.
  - 26. A kit according to any of claims 23 to 25, wherein the 5' primer and/or the 3' primer comprises at least 9 base pairs of exact identity at its 3' end.
  - 27. A kit according to claim 26, wherein the 5' primer and/or the 3' primer comprises at least 18 base pairs of exact identity at its 3' end.
- 28. A kit according to any of claims 23 to 27, wherein the first set of primers allows isolation of full-length adeno-associated virus capsid sequences from a sample, the first set of primers comprising a 5' primer directed to a region located in the middle of an AAV rep gene, based on a predetermined conserved region of AAV, and a 3' primer directed to a region downstream of an AAV cap gene, based on a predetermined conserved region of AAV.
  - 29. A kit according to claim 23, wherein the 5' primer has a sequence comprising GCTGCGTCAACTGGACCAATGA-GAAC, which corresponds to nt 1398 to 1423 of SEQ ID NO:6.
- 30. A kit according to claim 23, wherein the 3' primer has a sequence comprising CGCAGAGACCAAAGTTCAACT-GAACGA, which corresponds to the nucleotides complementary to 4462-4435 of SEQ ID NO:7.
  - 31. A kit according to any of claims 23 to 30, wherein the sample comprises AAV integrated into the chromosome.

#### Patentansprüche

5

10

15

20

35

- Verfahren zur Identifizierung unbekannter Sequenzen von adeno-assoziiertem Virus (AAV) in einer Probe, von der man annimmt, daß sie von einer latenten Infektion herrührendes AAV enthält, wobei man in den folgenden Verfahrenschritten
  - (a) die DNA-haltige Probe einer Amplifikation über eine Polymerasekettenreaktion (PCR) unter Verwendung eines ersten Primersatzes, mit dem spezifisch ein mindestens 250 Bp AAV-Capsid-Nukleinsäuresequenzen umfassender erster AAV-Bereich amplifiziert wird, wobei dieser erste Bereich eine an ihrem 5'-Ende von mindestens 18 Basenpaaren hochkonservierter Sequenz und an ihrem 3'-Ende von mindestens 18 Basenpaaren hochkonservierter Sequenz aufweist, wobei die Basenpaare relativ zu einer vergleichenden Anordnung von mindestens AAV1, AAV2, AAV3, AAV4, AAV5 und AAV6 hochkonserviert sind, aussetzt.
  - (b) gegebenenfalls die DNA einer weiteren Amplifikation unter Verwendung eines zweiten Primersatzes, mit dem spezifisch ein zweiter Bereich, der den ersten Bereich von AAV-Sequenzen sowie 5' zum ersten Bereich liegende Sequenzen umfaßt, amplifiziert wird, aussetzt, so daß 5'-AAV-Verlängerungssequenzen, die in einer Annealing-Reaktion an das 5'-Ende der mit den Primern für den ersten Bereich amplifizierten AAV-Sequenzen binden, erhalten werden.
  - (c) gegebenenfalls die DNA einer weiteren Amplifikation unter Verwendung eines dritten Primersatzes, mit dem spezifisch ein dritter Bereich, der den ersten Bereich von AAV-Sequenzen sowie 3' zum ersten Bereich liegende Sequenzen umfaßt, amplifiziert wird, aussetzt, so daß 3'-AAV-Verlängerungssequenzen, die in einer Annealing-Reaktion an das 3'-Ende der mit den Primern für den ersten Bereich amplifizierten AAV-Sequenzen binden, erhalten werden,
- wobei der zweite und der dritte Bereich jeweils auf der Grundlage der vergleichenden Anordnung der Nukleinsäuresequenzen von mindestens AAV1, AAV2, AAV3, AAV4, AAV5 und AAV6 vorbestimmt sind und die Bereiche relativ zu den Sequenzen von mindestens AAV1, AAV2, AAV3, AAV4, AAV5 und AAV6 jeweils am 5'-Ende der Sequenzen des Bereichs über mindestens 18 Basenpaare hochkonservierte Nukleinsäuresequenzen, in der Mitte gegebenenfalls variable Sequenzen und am 3'-Ende über mindestens 18 Basenpaare hochkonservierte Sequenzen umfassen und
  - die Primersätze jeweils aus einem 5'-Primer und einem 3'-Primer bestehen, das Vorhandensein amplifizierter Sequenzen das Vorhandensein eines AAV in der Probe anzeigt, und ein Vergleich der Unterschiede zwischen den amplifizierten Sequenzen und den Sequenzen von AAV1, AAV2, AAV3, AAV4, AAV5 und AAV6 das Vorhandensein eines unbekannten AAV anzeigt.
  - Verfahren nach Anspruch 1, wobei der Vergleich den Schritt des Vergleichens von Restriktionsenzymmustern für die amplifizierten Sequenzen mit Restriktionsenzymmustern von AAV1, AAV2, AAV3, AAV4, AAV5 und AAV6 umfaßt.
- Verfahren nach Anspruch 1 oder 2, wobei in Schritt (a) das Capsid-Gen in voller Länge amplifiziert wird.
  - 4. Verfahren nach einem der Ansprüche 1 bis 3, wobei die amplifizierten Sequenzen das AAV-Capsid-Gen und das AAV-rep-Gen umfassen.
- Verfahren nach einem der Ansprüche 1 bis 4, wobei die DNA aus Zellen, Zellkultur, Gewebe, Gewebekultur oder biologischen Flüssigkeiten extrahiert wurde.
  - Verfahren nach einem der Ansprüche 1 bis 5, wobei der erste Bereich über mindestens etwa 25 Basenpaare am 5'-Ende oder/und am 3'-Ende des Bereichs hochkonserviert ist.
  - 7. Verfahren nach Anspruch 6, wobei der erste Bereich über mindestens etwa 30 Basenpaare am 5'-Ende oder/und am 3'-Ende des Bereichs hochkonserviert ist.
- 8. Verfahren nach einem der Ansprüche 1 bis 7, wobei die hochkonservierten Sequenzen des ersten Bereichs unter den vergleichend angeordneten AAVs eine Identität von mindestens 80% am 5'-Ende oder/und am 3'-Ende des Bereichs aufweisen.
  - 9. Verfahren nach Anspruch 8, wobei die hochkonservierten Sequenzen des ersten Bereichs unter den vergleichend

angeordneten AAVs eine Identität von mindestens 90% am 5'-Ende oder/und am 3'-Ende des Bereichs aufweisen.

- 10. Verfahren nach einem der Ansprüche 1 bis 9, wobei die variablen Sequenzen in der Mitte des ersten Bereichs unter den vergleichend angeordneten AAVs eine Identität von weniger als 70% aufweisen.
- 11. Verfahren nach einem der Ansprüche 1 bis 10, wobei der erste Bereich von etwa Bp 2800 bis etwa 3200 von AAV1, SEQ ID NO:6, und den entsprechenden Basenpaaren in anderen AAV reicht.
- 12. Verfahren nach Anspruch 11, wobei es sich bei dem ersten Bereich um 257 Bp handelt, die von Bp 2886 bis etwa
   3143 von AAV1, SEQ ID NO:6, und den entsprechenden Basenpaaren in anderen AAV reichen.
  - 13. Verfahren nach einem der Ansprüche 1 bis 5, wobei es sich bei den Primern um AV1ns mit der Sequenz der Nukleotide 1398 bis 1423 der SEQ ID NO:6 sowie um AV2cas mit der Sequenz der SEQ ID NO:7 handelt.
- 15 14. Verfahren nach Anspruch 1 oder Anspruch 2, wobei der erste Primersatz die Isolierung von Capsidsequenzen in voller Länge von adeno-assoziiertem Virus aus einer Probe gestattet, wobei der erste Primersatz einen auf einen in der Mitte eines AAV-rep-Gens liegenden Bereich auf der Grundlage eines vorbestimmten konservierten Bereichs gerichteten 5'-Primer sowie einen auf einen stromabwärts von einem AAV-cap-Gen liegenden Bereich auf der Grundlage eines vorbestimmten konservierten Bereichs von AAV gerichteten 3'-Primer umfaßt.
  - 15. Verfahren nach einem der Ansprüche 1 bis 14, wobei die Probe in das Chromosom integriertes AAV umfaßt.
  - 16. Verfahren nach einem der Ansprüche 1 bis 15, wobei die Probe menschliches Gewebe umfaßt.
  - 17. Verfahren nach einem der Ansprüche 1 bis 16, wobei die Probe provirale AAV-Sequenzen enthält.
  - 18. Verfahren nach einem der Ansprüche 1 bis 17, wobei es sich bei dem ersten Bereich um einen Signaturbereich handelt.
  - 19. Verfahren nach einem der Ansprüche 1 bis 18, wobei die Basenpaare der hochkonservierten Sequenzen relativ zu einer vergleichenden Anordnung von AAV 1, 2, 3, 4, 5 und 6 und aus Gans und Ente isolierten AAV hochkonserviert sind.
- 20. Verfahren nach einem der Ansprüche 1 bis 19, wobei es sich bei der variablen Sequenz um eine hypervariable Sequenz handelt.
  - Verfahren nach einem der Ansprüche 1 bis 20, wobei der erste Bereich eine Länge von bis zu 10 Kilobasenpaaren umfaßt.
  - 22. Verfahren nach Anspruch 21, wobei der erste Bereich ein die cap-Sequenz in voller Länge umfassendes Fragment von 3,1 Kilobasenpaaren umfaßt.
- 23. Kit zum Nachweis des Vorhandenseins eines unbekannten adeno-assoziierten Virus (AAV) in einer Probe aus zellulärer DNA, von der man annimmt, daß sie eine latente AAV-Infektion enthält, wobei der Kit umfaßt:
  - (a) einen ersten Primersatz, mit dem spezifisch ein 250 Bp AAV-Capsid-Nukleinsäuresequenzen umfassender erster AAV-Bereich amplifiziert wird, wobei dieser erste Bereich an seinem. 5'-Ende mindestens 18 Basenpaare hochkonservierter Sequenz, eine variable Sequenz und an seinem 3'-Ende mindestens 18 Basenpaare hochkonservierter Sequenz aufweist, wobei die Basenpaare relativ zu einer vergleichenden Anordnung von mindestens AAV1, AAV2, AAV3, AAV4, AAV5 und AAV6 hochkonserviert sind,
  - (b) gegebenenfalls einen für einen zweiten Bereich der AAV-Nukleinsäuresequenzen, der den ersten Bereich von AAV-Sequenzen sowie 5' zum ersten Bereich liegende Sequenzen umfaßt, spezifischen zweiten Primersatz, so daß 5'-AAV-Verlängerungssequenzen, die in einer Annealing-Reaktion an das 5'-Ende der mit den Primern für den ersten Bereich amplifizierten AAV-Sequenzen binden, erhalten werden.
  - (c) gegebenenfalls einen dritten Primersatz, mit dem spezifisch ein dritter Bereich, der den ersten Bereich von AAV-Sequenzen sowie 3' zum ersten Bereich liegende Sequenzen umfaßt, amplifiziert wird, so daß 3'-AAV-Verlängerungssequenzen, die in einer Annealing-Reaktion an das 3'-Ende der mit den Primern für den ersten

355

5

25

30

50

Bereich amplifizierten AAV-Sequenzen binden, erhalten werden,

wobei der zweite und der dritte Bereich jeweils auf der Grundlage der vergleichenden Anordnung der Nukleinsäuresequenzen von mindestens AAV1, AAV2, AAV3, AAV4, AAV5 und AAV6 vorbestimmt sind und die Bereiche relativ zu den Sequenzen von mindestens AAV1, AAV2, AAV3, AAV4, AAV5 und AAV6 jeweils am 5'-Ende der Sequenzen des Bereichs über mindestens 18 Basenpaare hochkonservierte Nukleinsäuresequenzen, in der Mitte gegebenenfalls variable Sequenzen und am 3'-Ende über mindestens 18 Basenpaare hochkonservierte Sequenzen umfassen,

die Primersätze jeweils aus einem 5'-Primer und einem 3'-Primer bestehen, wobei jeder Primer mindestens 15 zur hochkonservierten Sequenz des jeweils anderen Primers komplementäre Nukleotide umfaßt und an seinem 3'-Ende über mindestens 5 Basenpaare eine genaue Identität mit der hochkonservierten Sequenz des jeweils anderen Primers aufweist.

- 24. Kit nach Anspruch 23, wobei der 5'-Primer und/oder der 3'-Primer mindestens 18 Nukleotide umfaßt.
- 25. Kit nach Anspruch 24, wobei der 5'-Primer und/oder der 3'-Primer mindestens 25 Nukleotide umfaßt.
- 26. Kit nach einem der Ansprüche 23 bis 25, wobei der 5'-Primer und/oder der 3'-Primer an seinem 3'-Ende mindestens 9 Basenpaare genauer Identität umfaßt.
- 27. Kit nach Anspruch 26, wobei der 5'-Primer und/oder der 3'-Primer an seinem 3'-Ende mindestens 18 Basenpaare genauer Identität umfaßt.
- 28. Kit nach einem der Ansprüche 23 bis 27, wobei der erste Primersatz die Isolierung von Capsidsequenzen in voller Länge von adeno-assoziiertem Virus aus einer Probe gestattet, wobei der erste Primersatz einen auf einen in der Mitte eines AAV-rep-Gens liegenden Bereich auf der Grundlage eines vorbestimmten konservierten Bereichs von AAV gerichteten 5'-Primer sowie einen auf einen stromabwärts von einem AAV-cap-Gen liegenden Bereich auf der Grundlage eines vorbestimmten konservierten Bereichs von AAV gerichteten 5'-Primer umfaßt.
  - 29. Kit nach Anspruch 23, wobei der 5'-Primer eine GCTGCGTCAACTGGACCAATGAGAAC umfassende Sequenz aufweist, die Nt 1398 bis 1423 der SEQ ID NO:6 entspricht.
  - 30. Kit nach Anspruch 23, wobei der 3'-Primer eine CGCAGAGACCAAAGTTCAACTGAAACGA umfassende Sequenz aufweist, die den zu 4462-4435 der SEQ ID NO:7 komplementären Nukleotiden entspricht.
    - 31. Kit nach einem der Ansprüche 23 bis 30, wobei die Probe in das Chromosom integriertes AAV umfaßt.

#### 40 Revendications

5

10

15

20

30

35

45

50

- Procédé pour identifier des séquences de virus associés à l'adénovirus (VAA) inconnus dans un échantillon dont on suspecte qu'il contient des VAA provenant d'une infection latente, ledit procédé comprenant les étapes :
  - (a) de soumission de l'échantillon contenant l'ADN à une amplification via une réaction de polymérase en chaîne (PCR) en utilisant une première série d'amorces qui amplifient spécifiquement une première région de VAA comprenant au moins 250 pb des séquences d'acides nucléiques de capside de VAA, ladite première région présentant une séquence variable adjacente à au moins 18 paires de bases d'une séquence hautement conservée en son extrémité 5' et à au moins 18 paires de bases d'une séquence hautement conservée en son extrémité 3', lesdites paires de bases étant hautement conservées par rapport à un alignement d'au moins VAA1, VAA2, VAA3, VAA4, VAA5 et VAA6;
    - (b) éventuellement de soumission de l'ADN à une autre amplification en utilisant une deuxième série d'amorces qui amplifient spécifiquement une deuxième région qui comprend la première région de séquences des VAA et des séquences qui sont côté 5' par rapport à la première région, de telle manière qu'on obtient des séquences d'extension 5' de VAA qui hybrident sur l'extrémité 5' des séquences de VAA amplifiées par les amorces pour la première région ;
    - (c) éventuellement de soumission de l'ADN à une autre amplification utilisant une troisième série d'amorces qui amplifient spécifiquement une troisième région qui comprend la première région de séquences de VAA et

les séquences qui sont situées côté 3' par rapport à la première région, de telle manière qu'on obtient des séquences d'extension 3' de VAA qui hybrident sur l'extrémité 3' des séquences de VAA amplifiées par les amorces pour la première région,

chacune desdites deuxième et troisième régions étant prédéterminée sur base de l'alignement des séquences d'acides nucléiques d'au moins VAA1, VAA2, VAA3, VAA4, VAA5 et VAA6, et chacune desdites régions comprenant des séquences d'acides nucléiques qui sont hautement conservées sur au moins 18 paires de bases en l'extrémité 5', des séquences éventuellement variables au centre et des séquences qui sont hautement conservées sur au moins 18 paires de bases en l'extrémité 3' des séquences de la région, par rapport aux séquences d'au moins VAA1, VAA2, VAA3, VAA4, VAA5 et VAA6; et

chacune des séries d'amorces étant constituée par une amorce 5' et une amorce 3'; la présence de séquences amplifiées indiquant la présence d'un VAA dans l'échantillon et une comparaison des différences entre les séquences amplifiées et les séquences des VAA1, VAA2, VAA3, VAA4, VAA5 et VAA6 indiquant la présence d'un VAA inconnu.

Procédé selon la revendication 1, dans lequel la comparaison comprend l'étape de comparaison de modèles d'enzymes de restriction pour les séquences amplifiées à des modèles d'enzymes de restriction des VAA1, VAA2, VAA3, VAA4, VAA5 et VAA6.

- Procédé selon la revendication 1 ou 2, dans lequel l'étape (a) amplifie toute 1a longueur du gène cap.
  - Procédé selon l'une quelconque des revendications 1 à 3, dans lequel les séquences amplifiées comprennent le gène cap du VAA et le gène rep du VAA.
- Procédé selon l'une quelconque des revendications 1 à 4, dans lequel l'ADN a été extrait de cellules, d'une culture cellulaire, de tissu, d'une culture de tissu ou de fluides biologiques.
  - 6. Procédé selon l'une quelconque des revendications 1 à 5, dans lequel la première région est hautement conservée sur au moins 25 paires de base en l'extrémité 5' de la région, en l'extrémité 3' de la région ou les deux.
  - 7. Procédé selon la revendication 6, dans lequel la première région est hautement conservée sur au moins 30 paires de base en l'extrémité 5' de la région, en l'extrémité 3' de la région ou les deux.
- 8. Procédé selon l'une quelconque des revendications 1 à 7, dans lequel les séquences hautement conservées de la première région présentent une identité d'au moins 80% avec les VAA alignés en l'extrémité 5' de la région, l'extrémité 3' de la région ou les deux.
  - Procédé selon la revendication 8, dans lequel les séquences hautement conservées de la première région présentent une identité d'au moins 90% avec les VAA alignés en l'extrémité 5' de la région, l'extrémité 3' de la région ou les deux.
  - 10. Procédé selon l'une quelconque des revendications 1 à 9, dans lequel les séquences variables au centre de la première région présentent une identité inférieure à 70% avec les VAA alignés.
- 11. Procédé selon l'une quelconque des revendications 1 à 10, dans lequel la première région s'étend de la paire de bases 2800 à environ 3200 du VAA 1, SEQ ID NO:6, et les paires de bases correspondantes dans les autres VAA.
  - 12. Procédé selon la revendication 11, dans lequel la première région représente 257 paires de bases, s'étendant de la paire de bases 2886 à environ 3143 du VAA1, SEQ ID NO:6, et les paires de bases correspondantes dans les autres VAA.
  - 13. Procédé selon l'une quelconque des revendications 1 à 5, dans lequel les amorces sont des AV1ns, présentant la séquence des nucléotides 1398 à 1423 de la SEQ ID NO:6, et des AV2cas, présentant la séquence de la SEQ ID NO:7.
- 14. Procédé selon la revendication 1 ou 2, dans lequel la première série d'amorces permet l'isolement de toute la longueur de séquences de capside du virus associé à l'adénovirus d'un échantillon, la première série d'amorces comprenant une amorce 5' dirigée sur une région localisée au centre d'un gène rep du VAA, sur base d'une région prédéterminée conservée et une amorce 3', dirigée sur une région en avai d'un gène cap du VAA, basée sur une

30

50

région prédéterminée conservée du VAA.

- 15. Procédé selon l'une quelconque des revendications 1 à 14, dans lequel l'échantillon comprend un VAA intégré dans le chromosome.
- 16. Procédé selon l'une quelconque des revendications 1 à 15, dans lequel l'échantillon comprend du tissu humain.
- 17. Procédé selon l'une quelconque des revendications 1 à 16, dans lequel l'échantillon contient des séquences de VAA provirales.
- 18. Procédé selon l'une quelconque des revendications 1 à 17, dans lequel la première région est une région de signature.
- 19. Procédé selon l'une quelconque des revendications 1 à 18, dans lequel les paires de bases des séquences hautement conservées sont hautement conservées par rapport à un alignement des VAA 1,2,3,4,5 et 6 et des VAA isolés à partir d'oies et de canards.
- 20. Procédé selon l'une quelconque des revendications 1 à 19, dans lequel la séquence variable est une séquence hypervariable.
- 20 21. Procédé selon l'une quelconque des revendications 1 à 20, dans lequel la première région comprend jusqu'à 10 kilopaires de bases en longueur.
  - 22. Procédé selon la revendication 21, dans lequel la première région comprend un fragment de 3,1 kilopaires de bases comprenant toute la longueur de la séquence du capside.
  - 23. Kit pour détecter la présence d'un virus associé à l'adénovirus (VAA) inconnu dans un échantillon d'ADN cellulaire dont on suspecte qu'il contient une infection latente par un VAA, ledit kit comprenant:
    - (a) une première série d'amorces qui amplifient spécifiquement une première région comprenant 250 paires de bases de séquences d'acides nucléiques d'un capside de VAA, ladite première région présentant au moins 18 paires de bases d'une séquence hautement conservée en son extrémité 5', une séquence variable et au moins 18 paires de base d'une séquence hautement conservée en son extrémité 3', lesdites paires de bases étant hautement conservées par rapport à un alignement d'au moins VAA1, VAA2, VAA3, VAA4, VAA5 et VAA6; (b) éventuellement une deuxième série d'amorces spécifiques d'une deuxième région des séquences d'acides nucléiques de VAA qui comprend la première région des séquences de VAA et des séquences qui se situent côté 5' par rapport à la première région, de manière à obtenir des séquences d'extension 5' des VAA qui hybrident sur l'extrémité 5' des séquences de VAA amplifiées par les amorces pour la première région, qui comprend la première région de séquences qui amplifient spécifiquement une troisième région, qui comprend la première région de séquences de VAA et des séquences qui se situent côté 3' par rapport à la première région, de manière à obtenir des séquences d'extension 3' de VAA qui hybrident sur l'extrémité 3' des séquences
    - chacune desdites deuxième et troisième région étant prédéterminée sur base de l'alignement des séquences d'acides nucléiques d'au moins les VAA1, VAA2, VAA3, VAA4, VAA5 et VAA6, et chacune desdites régions comprenant des séquences d'acides nucléiques qui sont hautement conservées sur au moins 18 paires de bases en l'extrémité 5', éventuellement des séquences variables au centre et des séquences qui sont hautement conservées sur au moins 18 paires de bases en l'extrémité 3' des séquences de la région, par rapport aux séquences au moins des VAA1, VAA2, VAA3, VAA4, VAA5 et VAA6;
    - chacune des séries d'amorces étant constituée par une amorce 5' et une amorce 3', chacune desdites amorces comprenant au moins 15 nucléotides complémentaires à sa séquence respective hautement conservée et présentant une identité exacte avec sa séquence respective hautement conservée sur au moins 5 paires de bases en son extrémité 3'.
  - 24. Kit selon la revendication 23, dans lequel l'amorce 5' et/ou l'amorce 3' comprend au moins 18 nucléotides.
  - 25. Kit selon la revendication 24, dans lequel l'amorce 5' et/ou l'amorce 3' comprend 25 nucléotides.

de VAA amplifiées par les amorces de la première région;

26. Kit selon l'une quelconque des revendications 23 à 25, dans lequel l'amorce 5' et/ou l'amorce 3' comprend au moins

15

5

25

30

35

40

45.

50

9 paires de bases d'identité exacte en son extrémité 3'.

5

10

20

25

30

35

40

45

50

55

- 27. Kit selon la revendication 26, dans lequel l'amorce 5' et/ou l'amorce 3' comprend au moins 18 paires de bases d'identité exacte en son extrémité 3'.
- 28. Kit selon l'une quelconque des revendications 23 à 27, dans lequel la première série d'amorces permet l'isolement de toute la longueur des séquences de capside d'un virus associé à l'adénovirus d'un échantillon, la première série d'amorces comprenant une amorce 5' dirigée sur une région localisée au centre d'un gène rep d'un VAA, basée sur une région prédéterminée conservée d'un VAA et une amorce 3' dirigée sur une région en aval d'un gène cap d'un VAA, basée sur une région prédéterminée conservée d'un VAA.
- 29. Kit selon 1a revendication 23, dans lequel l'amorce 5' présente une séquence comprenant GCTGCGTCAACTG-GACCAATGAGAAC, ce qui correspond aux nucléotides 1398 à 1423 de la SEQ ID NO:6.
- 30. Kit selon la revendication 23, dans lequel l'amorce 3' présente une séquence comprenant CGCAGAGACCAAAGTT-CAACTGAAACGA, qui correspond aux nucléotides complémentaires à 4462-4435 de la SEQ ID NO:7.
  - 31. Kit selon l'une quelconque des revendications 23 à 30, dans lequel l'échantillon comprend un VAA intégré dans le chromosome.